THE

SOUTHERN AGRICULTURIST.

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PART I.

ORIGINAL CORRESPONDENCE.

ART. I.—*Account of the process of Cultivating, Harvesting, and Manufacturing the Sugar Cane; by* JACOB WOOD.

To the EDITOR of the SOUTHERN AGRICULTURIST.

Sir,—Though desirous of communicating all the information I possessed, respecting the culture of the Sugar Cane, yet I felt a peculiar delicacy in offering my opinion to the public, notwithstanding you had politely solicited me to do so; nor should I now have ventured to address you, but from seeing my name introduced in a recent number of your work, and being the person alluded to in another production of the day. In the remarks which I shall now with great candour submit to you, I shall confine myself solely to my observations and practice; being under an impression, that the general manner in which the subject has been presented to the public, has not conveyed that degree of accurate information, necessary to enlighten those who are disposed to embark in this new culture. I have always planted the Cane on river swamp-land, and generally one hundred acres. To meet this culture, I had four squares of from twenty to twenty-five acres specially prepared for it: in each square there are five parallel ditches, from five to seven feet wide and three feet deep, besides one of the same size at either end. This was done the better to drain the land, as well as with a view to facilitate getting the Cane home; the labourer having only to carry it on an average seventy feet. I have planted it both ways, *flat* and

on *beds*, but prefer the former: a furrow is run with what is called the scouter plough, at every four feet, (the distance of the rows apart, which are again transversely cut at every twenty-five feet) and one is thrown on each side of it: the Cane is cut from four to five joints long, and laid on the pulverized surface, end ways, and touching, and if possible, the eyes horizontally; it is then covered with the hoe about two inches deep, and there remains until it begins to come up. I commence planting in January, and if the seed is near, two hands will plant a task, thus prepared, in a day. I put from three to four thousand Cane to the acre: my reason for cutting is, that I have found the Otaheite Cane, where one eye sprouts, is apt to substract the juices from the others, while the Ribbon Cane on the contrary, sprouts from every eye. I have also found if I could get one bud from each cutting, it will be sufficiently thick, as each will tiller from five to seven stalks: twenty thousand Cane to the acre with me, will make a profitable return, and in the fall I estimate the probable produce, by averaging the quantity of stalks and their size in a task. The first hoeing is down or from the plant, all the subsequent ones are hauling up to it, giving a high, broad bed: the crop generally has five to six hoeings, and the nearer the land is kept to garden tilth, the better it will be. The seed for the next year is taken up about the middle of October; the root is dug with the stalk, and left for several days exposed to the sun to cure the blade, otherwise if put up green, it would heat and injure the eyes; as much cane as can conveniently be laid in two adjoining rows, one stalk root overlapping the other backward, is the size of the matrass, which is never made more than two feet high; the earth is drawn up on each side, nearly to a level with the top, leaving the upper surface open, with a view to let the heat escape, but as the cold weather sets in, they are entirely covered over, and unless the winter is very warm, seed put up in this way, will keep until April. As the future crop depends on the goodness of the seed, it is of primary importance to take all possible care of it, cold being its greatest enemy. The soundness of the seed of the white Cane, is known by the eye not yielding to the touch, and looking green when opened; on the contrary, in the Ribbon Cane, the eye often remains firm, when the vegetating principle is destroyed. I would observe that the root of the Cane is often used as

seed, after the stalks which grew on it have been manufactured. The grinding season commences the first of November, though by planting a small proportion of the crop in Ribbon Cane, this operation may be anticipated a week or two. I have tried the two species generally cultivated here, as also the Creole Cane: of the three I prefer the Otaheite, (called the white, as the ribbon is the red,) and am trying to get rid of the red. I never could discover more than one degree, by Beaumé, difference in the saccharine matter between them; though that was in favour of the Ribbon Cane; but as a set off against this, the white Cane produces from 30 to 40 per cent more juice, is easier to grind, and the juices continue to *grow richer* the longer the *frost keeps off;* while those of the red becomes stationary early in November, and as far as I have observed, *rather deteriorate, than improve as the season advances;* besides, it has a hard, resisting stalk, and requires an increased power to grind it; from the absence of juice, and the thickness of the outer coat, it resists moderate frost better than the other; but a severe black frost will destroy equally the *white joints of both*, and from that moment a retrogade action takes place, tending to a rapid dissolution of the saccharine juices: by the white joint, I mean the soft, succulent joints at the top of the Canes, in which the topmost leaves are imbedded, containing little sweet, but much watery juice. This is the growing part of the Cane, and as long as it is alive, the regular vegetation of the plant continues, but a severe frost destroys it, which is known by the top joints when drawn, coming out with ease, and looking of a claret colour. The operation of frost on Cane, I shall briefly refer to hereafter. Having disposed of the seed, and ready for grinding, I use little flats fourteen feet long, four feet wide, to transport the Cane from the field. Two hands, unless the cane is very thick, cut a task per day, say one strips off the leaves with a billhook, and then cuts the top off below the white joint, the other cuts the stalk down, and a third carries it to the side of the ditch, to put it in the flats; one man manages two flats, (one tied behind the other) and draws them with a pole with great ease, much in the same way that the canal boats are moved. These flats navigate every part of the fields, and travel with a load of from three to five hundred Canes, averaging three feet long, at the rate of two and a half miles an hour, and a third faster when empty. Twen-

ty flats will bring to the Mill two acres of Cane in fourteen hours, the distance averaging five-eighths of a mile. I have for fifteen years used the inclined plane, which I have gradually reduced from one hundred and thirty, to eighty feet in length: four cast iron wheels, with iron axle trees, the hind wheels treble the diameter of the fore, which are only six inches, (done with a view to keep the flats as much on a level as possible, while coming out of the water,) are coupled by a slight frame of wood; this carriage goes under the water every time it runs down the plain. A rope one and a quarter inches diameter, fastened to a tongue, connected with the fore axle-tree, and passing over two sheaves through the mill-house to a post having a conical shape, into which a lever is inserted, and drawn by a small horse not twelve hands high, will bring the flat in two minutes to the cane table; where two hands unload it, one of whom attends below, and puts the flat on the carriage, and then ascends to assist in discharging it; as soon as this is done, the horse is taken from the draft pole, and the flat descends in ten seconds by its own gravity; when the carriage reaches water deep enough, the empty flat floats off and its place is immediately supplied by a loaded one: this operation is very simple, and performed with great facility. I at first drew the flats twenty feet above the water level, but now they only ascend about twelve feet. My grinding house is forty feet square; on the ground floor the animal power moves; four yoke of oxen, or three horses will grind a pan of the white Cane juice in an hour; the cattle are changed every pan; cane tops and rice straw for oxen, and skimmings added for horses, keep them in good order; four changes will, with great ease, keep the mill going eighteen hours out of twenty-four. The propelling power being underneath, gives the second story exclusively for the accumulation of Cane, for the consumption of the earlier part of the night, as well as the morning. The mill is on this story, and up to which the flats ascend. My Mill is vertical; I imported it from Liverpool ten years ago, and it then cost three hundred guineas. I had it made agreeable to my own directions, the middle roller thirty inches and the side rollers, twenty-four inches diameter, with *two sets of cog wheels, one working under the mill-bed, that receives the juice*, the other at the top of the rollers, with a *cylindrical return feeder;* in twenty hours six thousand gallons have

been produced from the Otaheite Cane. It takes two hands to feed, one to carry the expressed stalk, (called by the French, *begasse)* up steps, to the third story, where it is thrown into a shute, from whence it descends to the ground and is removed to a convenient distance by a fourth, the juice runs into a large tub, and by a copper pump of two inches diameter is raised to a gutter, that carries it forward into the boiling house. I have four cold clarifiers of wood, each containing three hundred gallons; two copper pans holding the like quantity each; in either one or the other, the lime is put, generally at the rate of a pint to a hundred gallons: for sugar I lately used marble lime from Mr. Livingston's quarry, in the State of New-York, which from an analysis sent me, contained out of one hundred parts only one of silex; the *quality* of the lime is of considerable importance in boiling of sugar. In the British West-Indies, they use Bristol lime. From the pans the liquor descends into the boilers, of which there are four of copper, containing one thousand gallons; the furnace or battery, is after a pattern from Louisiana, there called "the boat shape," and so powerful is it, that the coppers with only half their contents, can be made to boil over, though the lip to each is twelve inches *and not included in fining the contents;* to both the chimney and pans there are cast iron dampers to regulate the fire; pine wood is generally used, and the consumption is estimated at two cords to the acre. In the boiling-house hangs Beaumé's Hydrometer, to ascertain the quantum of sweets, and the long thermometer, which is used to ascertain the exact period when the liquor in the *teach* has arrived at the sugar point; this valuable instrument is to be procured at Pikes, Wall-street, New-York.

I have entered into this detail, to give some idea of the arrangements which are necessary for a Cane crop; for the want of information of this nature when I commenced, I was obliged to grope my way in the dark. The first year that I began with the Cane, my Mill, copper boilers, &c. did not cost $300, and I had a very large return for twenty acres, with which I commenced; to this was added much experience in the routine of grinding, clarifying, boiling, &c. which greatly facilitated my subsequent operations. I owe it as a duty, frankly to state, that after an experience of sixteen years, in the culture of the

Cane, I am convinced that sugar must be made in the field, or in other words, unless the juice has attained a sufficient degree of richness, it is not only difficult, but unprofitable, to boil for sugar, and I have fixed this point so far as relates to my own soil at 8° and upwards of Beaumè; this in my humble opinion is attributable solely to the luxuriant growth of the Cane and the consequent attenuation of its juice. I have understood that neither in the West-Indies nor in Louisiana, can sugar be readily made from Cane of this particular description. Hence I infer that difference of soil, produces different results, and that Cane produced from a sandy soil, may give richer juice, yet still the disproportion in quantity, compared with that from luxuriant river swamp Cane, is more than can readily be believed. For many years after I commenced this new culture, I was under an impression, that there was an art in boiling the juice into sugar, and that my frequently not succeeding to the extent of my wishes, was owing entirely to a want of experience, and not to the peculiar character of the juice. I therefore began, first with boilers from the West-Indies, of which I tried four, without any satisfactory result. I next employed a Beet sugar boiler from Paris, Mons. Vergin recommended to me by Marshal Grouchy: after he had made a variety of experiments, in straining, clarifying, slow and rapid boiling, he failed, not to make sugar, but to make it with that facility required by having thirteen hundred gallons of liquor constantly *in transitu*, and which must be almost immediately disposed of. I then brought from Louisiana one of the best boilers there, Mons. Barron, but he was equally unfortunate, so that after spending near $1000, I found on my river swamp, there were seasons, when neither the red nor white Cane, could be *profitably* manufactured into sugar, which I never have failed to make, but the question was whether it was prudent fastidiously to pursue the culture solely for that object, or direct the manufacture to suit the *soil* and *seasons*, to an attainable and profitable purpose, exceeding, as the result has been, in the difference of from 20 to 30 per cent, besides a very considerable saving of labour in the boiling house. In the year 1828, we made sugar with great facility; the juice standing then above 8°: I, for the first time, used the sulphuric acid, in the proportion of a half pound to three hundred gallons, mixed with the juice in its crude state,

and then limed as usual. That there is a gum, gluten, or albumen, or something in cane juice derived from the luxuriant product of river swamp, and which prevents its speedy granulation, I am now fully convinced of. Neither *lime* nor *heat*, acts on it with sufficient effect: by the addition of too much of the *former*, the sugar is darkened, and no skimming can sufficiently purify it, by the *latter*, so as to prevent this material passing on with the syrup, and arresting rapid crystallization, so necessary in the operation of a large boiling-house. The sulphuric acid put on no appearances, by which its effects could be judged, until it came into the *teach*, then I observed it uniformly reduced the volume of fluid, below the ordinary quantity, which in that kettle always increased in bulk, in proportion to the presence of this offensive matter. How this acid acts, I am not prepared to say, though my present impression is, as a solvent, derived from its caustic character. From personal observation, I believe it a valuable agent applied to the juice of luxuriant cane. I have also used the yellow clay, recently patented, in the proportion of a quart or more to a pan, made very thick and stirred well in with the juice ; this also had a good effect : its agency I accounted for, from its tenacious character seizing hold of the grosser particles afloat in the juice, and precipitating them by its gravity. Some sugar that I made with both these agents, had a good colour, and parted with its molasses freer than without them.

Our climate, though evidently amelioratory, I fear, is yet too cold for the Cane plant to arrive at perfect maturity. In 1828, on the 7th and 8th of April, I had all my Cane cut down by the frost, though there were up in many places one hundred plants to a task row ; it however sprouted again, and the crop was a fair one, there being no frost to injure, that season, until after Christmas. In 1829 it was also injured in the spring, but early in November, such was the severity of the cold, that the white joints of both species were frozen. I immediately cut all mine down, and afterwards put it in matrasses, as wide and as long as possible ; previous observation had taught me, that the moment the vegetative principle was destroyed, there commenced a gangrene in the upper joints, which gradually descending affected the sacharine fluid within, while a rapid evaporation was going on from the outer coat of the

stalk, from the action of both sun and air, which is evident from those stalks getting lighter, the longer they stood and the juices running into acidity. By laying them horizontally and covering thick as possible, they remained longer sound and the juices sweeter. The manufactory went on from the matrasses. *I am told* that those who left their Cane standing, lost materially by it.

With respect to the soils best adapted to the culture of the Cane, I have no doubt but those of a silicious nature, will produce the richest juice and make the best sugar, provided they have two qualities attached, say *richness and moisture*; without an adequate proportion of the *latter*, the return will *certainly be small.* Our pine lands, with those two ingredients produce fine Cane. With respect to moisture or a supposed excess of it, on this plant, I have had from uncommon freshes, my Cane fields for a week at a time covered with water, yet the Cane came up well and prospered. In 1824, from the combined causes of hurricane and high tides, the fields could not be kept dry for near three weeks, two of which there was two feet water on the cane, yet the crop was a good one. In 1827 the cane did not begin to joint until the last of September, repeated floodings brought it forward, and a tolerable crop was made.

These facts I submit to you, and with them wish it distinctly understood, that the foregoing remarks are confined to my own plantation, and though among the oldest cultivators of the Cane on the Altamaha, I know little or nothing of the pursuits of others.

The increasing culture of the Cane I consider of great and general utility, because it is within the reach of every one, and brings to the door of the poor, what may be termed to them a luxury, and though we should never make enough from it to export, yet it is a matter of considerable importance to supply our home consumption. Many are generally too sanguine on this subject, yet there is enough to be made from it to reward those who have lands adapted to it, and make it a component part of their crop.

I am, sir, very respectfully, yours,

JACOB WOOD.

Potoir, 15th January, 1830.

ART. II.—*A few additional Observations on the Manufacturing of Sugar; by* DR. THOMAS COOPER.

To the EDITOR of the SOUTHERN AGRICULTURIST.

"Columbia, March 5, 1830.

Dear Sir,—The experiments to which I alluded, were founded on an expired patent, (Brevet d'Invention) of M. De Rosné, in France. Spirit of Wine is to be passed through the mass of Sugar under atmospheric pressure, there being a vacuum produced in the vessel below, by an air pump. The vacuum being thus produced, the air forces the Spirit of Wine through the mass of Sugar, carrying with it great part of the colouring matter, and improving the grain of the Sugar. The Spirit of Wine is recovered with little loss by re-distillation.

I have produced very manifest improvement both in colour and in grain, by Spirit of Wine percolating through sugar without the aid of a vacuum below, which I am satisfied would be a great improvement.

My experiments with Chloride of Lime, have not been satisfactory to me *as yet*.

The process that pleases me best of any I have read, is to be found in Vol. 5, No. 2, Feb. 1830, p. 100 of the Journal of the Franklin Institute, which, if I were concerned in the refining of Sugar, I should put in practice without hesitation.*

I should have pursued De Rosné's process further, but I cannot get the necessary apparatus made here.

The last English patent is one granted to John Bates, Bishopsgate-street-within, Merchant, for his new method of whitening Sugar, dated August 1, 1829, which I have sent for.

I am, dear sir, your ob't serv't.

THOMAS COOPER.

* This is the process described in our note to Dr. Cooper's communication "On the various Processes of Manufacturing Sugar."—*Vide p. 70.*

ART. III.—*Account of an attempt to Cultivate the Olive; by* JOHN COUPER. *(Being an extract of a Letter to the Editor, dated St. Simons, 14th February, 1830.)*

* * * * *

Two years ago I informed you of my success in setting out Olive cuttings—the result, only about one third succeeded. And last April, I set out with great care some thousands, (perhaps too late) they all took the liberty of rotting. I am, however, persevering in those matters, and have set out two thousand cuttings this spring, by burying them horizontally, about four inches deep. My old Olives generally produced *scantily* last year. I anticipate a tolerable crop this year, and will endeavour to make some oil.

I am not of opinion the Olive will be an object of great profit, but if we could introduce oil amongst our slaves, it would add much to their comforts.

I shall conclude by assuring you, if I can possibly furnish any thing that will be useful, I will do so in spite of my own conviction that I am inadequate.

I am, very respectfully, your obed't serv't.

JOHN COUPER.

ART. IV.—*On Horizontal Ploughing; by* A PRACTICAL PLANTER.

To the EDITOR of the SOUTHERN AGRICULTURIST.

Sir,—The mode of laying off a field horizontally, is performed with a wooden compass, eight or ten feet distant at the feet, having a string at the upper part, to which a piece of lead is to be suspended, similar to a mason's plumb. A cross piece must be attached to the compass, about two feet from the top, and on the centre of this piece, a perpendicular mark is to be made; this is not only intended to prevent the plumb-line from going to and fro, but to discover the level, by the plumb-line ranging with this mark. A hand is to follow the one with the compass, and when the latter cries out chop, it must be done with a hoe at the foot of the compass next the hoe hand, and so on until the line is

run; another hand with a shovel plough is then to follow the chops, which may be termed the guide rows.

These guide rows are to be made from twenty, thirty, or more yards distant from each other, according to the broken state of the land; the eye must then be the guide, and whenever the ploughman finds he is deviating from the level, he must throw in short rows to return to it.

Although this plan may appear very formidable at first view, it will soon become familiar to those who attempt it. Almost any overseer or intelligent negro, who never saw a horizontal furrow run, will become expert at it in one season, and the horses will soon get in the way of it, and after a little practice, will require no more guiding, than going on a straight line.

In horizontal culture, it may also be remarked, that in order the more effectually to prevent washings, belts or spaces should be left, from eight to twelve feet wide, at such distance apart as the land will point out, these belts will soon grow up in grass or shrubbery, or the corn and cotton stalks may be put in them the first year, thereby forming a barrier, checking in time of heavy rains the impetuosity of the water, should the beds be overflowed, and so dispersing it, as to prevent such concentrations as must inevitably produce gullies, ruinous to the land.

Objections may be made to this recommendation, from the idea, that these belts will occupy too much of the land, but when it is taken into view, the security afforded by them, the objections will vanish, and I am certain, whoever makes the trial, will have no cause of regret. New lands may be treated in the same manner, which is seldom or never done, from the impression, that they will not wash for one, two, or three years; but when lands are the least precipitous, more or less of the soil must be lost from up and down hill tillage, and at last it will have to be done, and it can be done with more accuracy the first year than afterwards, a smoother surface being presented to effect it, than when the land has been made into ridges, which will require an additional breaking up when it is horizontallized, which proves no economy in labour.

In new lands, all the timber that is unfit for rails, and the brush, may be put into the belts, instead of being burned; this will not only act as a security, but saves as fuel,

and when exhausted, cotton and corn stalks can be substituted.

Fields that are laid out horizontally, never require the beds to be altered, only the reversion of them, and should be laid off cotton-distance width, according to the strength of the land, which will also answer for corn, giving a suitable distance on the beds in proportion to the width, leaving but one stalk. Indeed the plough should never run any other way than horizontally, unless small grain is to be sown, and then it should be broken up obliquely, and the grain ploughed in horizontally. Many persons plant on the same bed two years in succession, under the belief, that the soil deposited the previous year, is more congenial to the plant, not considering that the extended roots contribute as much to the nourishment of the plant, as the principal ones, and when these lateral roots in their extension, come to the space from whence the soil has been taken, meet with a check, which must consequently effect the plant. It is more advisable to reverse the beds annually, it not only distributes the soil more equally, but will pulverize the earth more effectually, and the more this is done in our tenacious soil, the better effect will be produced. The reversion of the beds should be done, by first running a broad and long pointed shovel-plough, in the alleys or spaces between the old beds, then returning into the furrow made by it, with mould-board ploughs, all the trash or matter that may act as manure within its reach, after which a water-furrow plough may be run in the centre to designate the beds; this will make a handsome bed, covering up every thing.

With regard to manuring in this section of our country, it is impracticable to any extent, from the quantity of land appropriated to each hand. What resources are there, to manure twelve, fifteen, or twenty acres of land, allotted to the hand annually to attend, even with the assistance of the plough? In England, where perhaps the system of manuring is carried on to as great an extent as any other country, this is much attended to, and is caused by local circumstances. The dense population and scarcity of land, compels a resort to it; from this we are exempt, and so long as the immense forests in the Western and Southern States remain uncultivated, and can be had so cheap, inviting from its superior quality and other

advantages, it would be folly to attempt resuscitating our worn out lands by manuring; besides these lands have been so completely dispossessed of the means of fencing, that poverty would stare any man in the face in the undertaking. They must be abandoned, until a new growth is produced, to return a soil by decayed vegetation, to a surface perfectly divested of it by bad culture, and this will require ages.

A PRACTICAL PLANTER,
Of Edgefield District.

ART. V.—*Directions for Cultivating the various Crops grown at Hickory Hill; by* B. MCBRIDE.

(Addressed to E. M. Speights, and by him communicated for publication in the Southern Agriculturist.)

[*Concluded from page* 177.]

Fourthly, you have now planted, say, one hundred acres of corn, and each hill has its regular quantum of manure. I wish fully to impress the necessity of early thinning this corn; by doing this you not only accelerate and give the standing stalks a better chance to grow, but you leave the compost to yield its early support of two, instead of exhausting it in the support of, say four, five, or six stalks. With this corn should you have favourable seasons, you will have but little trouble; three ploughings will perhaps be quite sufficient. What remains of the manure I advise to be placed round this corn by the crow minders, on their *last days of service.*

You have yet to plant, say one hundred acres more of corn, which you have it in your power to manure with cotton seed. This I advise you to do as soon as the corn will bear the seed, which it will do at from eight to twelve inches high, thinning just before you manure, and ploughing it immediately afterwards, but to this last rule there is an exception, for in ploughing th corn immediately after placing the seed round the hill, might cover the seed (which is the intent) in a perfectly dry state, which I have and ever will be opposed to.

Fifthly, Potatoes as a provision crop are worthy of the planter's first consideration. I therefore suggest the pro-

priety of your planting a large and early crop from both the sprout and vine; this you may conveniently do from your fields of root and sprout potatoes being contigious to that intended for the vine; from these fields you may flatter yourself with a hope that they will yield a handsome production from the quantum of manure with which they have been enriched: connected with this crop (potatoes) and with the same seasons you can add to the provision crop by planting standing Peas, with these will end the last planting season of the year.

Rice.—I deny the skill necessary for the planting or management of this crop, therefore decline giving advice, and leave it entirely for your discretion, to act as your judgment may direct you, but will barely suggest, (and in this instance only,) the propriety of your consulting the driver, being an old rice planter.

Respecting my stock of horses and cattle, particularly my breeding mares, I have said quite enough to you on this subject, to well impress my request on your mind. Under this consideration, I decline a repetition, further than to request my young horses should be stabled, and salted twice a week, as well as the plough horses.

Finally, the proper management and discipline of slaves, subjects the man of care and feeling to more dilemmas than perhaps any other vocation he could follow. To keep a diary of their conduct, would be a record nothing short of a series of violations of the laws of God and man. To moralize and induce the slave to assimilate with the master and his interest, has been and is the great desideratum aimed at; but I am sorry to say I have long since desponded in the completion of this task. But, however true this picture may be, of those servile creatures, we are bound under many sacred obligations, to treat them with humanity at all times, and under all circumstances. Although compelled to use coercive measures for their good discipline, yet we should never lose sight of humanity in its strictest sense. Under all these considerations, it requires for the good management and discipline of those people, a man of steady habits, connected with sobriety, fortitude, energy, and humanity, and a passion for enterprize. To clothe the naked, feed the hungry, and sooth the sick, should be our ceaseless duty toward the slave; and to compel them to do theirs, should be the order of the day.

And that you should be enabled to continue the same rules and mode of discipline, as hitherto exercised for years on my plantation, I will here lay down a few of the most important ones as they occur to my mind, and for further information I refer you to a strict perusal of my agricultural book, under head of "Trials and Punishment;" being well convinced from experience that too frequent changes in the management, *rules*, and *laws*, of a plantation, is apt to cause discontent and disorder among the slaves. And first, in order to make an equal distribution of labour, which slaves are quick to understand, you will find in all my cultivated fields in a greater or less degree, a difference of soil and surface; on the stiff and grassy employ able bodied men; while the breeding women and *weaker field hands*, work the same quantity per day in the light soil. And in all work strive to manage in like manner. And at the same time let an equal distribution of rewards and punishment be given to all the slaves. Each and every one should have a fair trial for a crime touching character, before punished, and when punished, avoid the whip as much as possible, and let other modes of punishment be substituted in lieu.

All intercourse with negroes of other plantations, is strictly forbidden.

Marriages shall be performed in every instance of a nuptial contract, and the parties settled off to themselves without incumbering other houses, to give discontent. No slave shall be allowed to cohabit with two or more wives or husbands at the same time, doing so shall subject them to a *strict* trial and *severe* punishment.

All my slaves are to be supplied with sufficient land, on which encourage, and even compel them to plant and *cultivate* a crop, all of which I will, as I have hitherto done, purchase at a fair price from them. This crop can be tended during their idle hours, after task work is done, which otherwise would be spent in the perpetration of some act that would subject them to severe punishment.

I have all allowance-corn ground at my water-mill as hitherto, into grist or meal, as the owner may wish; this, and fish, together with the milk of fifty or sixty cows, will enable you to perform that duty towards the slaves, which has been a cordial to me for years. Pay strict attention, and compel, if necessary, my old nurse to do her

duty towards the little negroes; a duty she well knows how to perform—to give worm medicine, pride of India, pink root and spirits turpentine, alternately; supply her with molasses for this purpose, as well as to put in their hominy—to be kept washed and cleansed, and their victuals, as well as the field hands, to be well prepared by the cooks.

No before-day work, good day light will be quite time enough to commence the labour of the day. These last I consider of vital importance to the good health of the negroes, and must add, I wish them strictly attended to.

The foregoing are some among the rules and regulations which have both guided me in the culture of my land, and discipline of my slaves, for many years, and such as I will not be vain enough to say, have caused me to excel, but will venture to say, equalled the best, and from which I flatter myself you will be aided in your agricultural labours.

B. McBRIDE.

ART. VI.—*Observations on the Chickasaw Pea; by* JOHN B. MILLER.

To the EDITOR of the SOUTHERN AGRICULTURIST.

"Sumterville, 4th February, 1830.

Sir,—I received from Mr. Herbemont, a pint of the Chickasaw Peas, with a condition that I should give you an account of the same. I distributed some amongst my neighbours, some I planted in my garden, some in swamp land, and some in high pine land. Those planted in swamp land did not come up well, they were, I think, covered too deep. Those in the garden did tolerably well, and those on the pine land did well. With about a gill I planted about half an acre, and raised near a bushel; some shattered out from standing too long. I am satisfied, that planted for the purpose of being ploughed in as manure, they are advantageous, if done before full grown.

Permit me to suggest to you, to publish monthly, the price of produce and stock, for each week; at some future day it will be useful to refer to.

I am respectfully, your ob't serv't.

JOHN B. MILLER.

ART. VII.—*Observations on the Cultivation of the Cow-pea as a green Vegetable Manure; by the* EDITOR.

(Continued from page 196.)

Our next subject of inquiry, is, whether it is advisable for us to cultivate the Cow-pea for the sole purpose of ploughing it under for manure. The object of every planter should be to increase the fertility of his fields, or at least he should take such care of them that they will not retrograde. This can only be effected by constantly returning an equivalent to the soil in the shape of manure, for the crop taken off; should the quantity be greater, the fertility of the soil will be increased, as well as its capability of producing crops; but should no manure be applied, or a less quantity than will compensate for that which has been removed, an injury will have been done to the soil to that extent, and which although it may not be perceptible in the succeeding crop, yet is nevertheless certain, and will become very evident, should the practice be continued. It should, therefore, be the serious occupation of every planter to collect and increase, by every means in his power, this most essential requisite for all crops. It should not be neglected or made a secondary object, as unfortunately is but too much the case at present among us.

But with every assistant no one will have it in his power to manure all of the land which he is capable of planting, unless the quantity be very small, or he uses those of a stimulating nature, such as lime, gypsum and salt, or alteratives, such as clay, sand, &c.; these are required in very small quantities by the plant, and do not of themselves add to the fertility of the soil, further than by bringing into action those substances already existing there. Recourse must therefore be had to other sources, than the farm yard, or but a portion, (and often a very small one) can receive any assistance from the planter. Rotation of crops has been resorted to with considerable effect, and is founded on the belief that each plant draws from the soil only such substances as are peculiarly fitted for its support, and that when it has exhausted these it will no longer thrive there, but yet that the soil retains an abundant supply of such nourishment as is well suited for another species, which will in turn flourish until it has exhausted its store, and then give place to others, and this rotation can be continu-

ed until the number of crops cultivated have been gone through with, care being taken that no two, of the same kind should occupy the soil in succession. Although this opinion is generally received as correct, and has been found beneficial in practice, yet it is not altogether so, for although plants will succeed better, and be more productive when they follow those which are dissimilar, yet no rotation of crops can supply the place of animal or vegetable manures. The soil will yearly become less productive, and finally will not compensate the husbandman for the labour bestowed. The cause of this is readily explained. The simple earths although they enter into the composition of nearly all plants, yet do not of themselves afford any nourishment nor can any substance which has not previously existed in the shape of organized matter, become the food of plants. Giobert mixed allumine, silex, lime, and magnesia, in such portions as is usually found in fertile soils, and in this he sowed several varieties of seeds; they germinated, but existed no longer than they were supplied with nourishment by their cotyledons, when this failed, they perished. It appears, therefore, absolutely necessary, that animal and vegetable substances should exist in the soil, and that their loss should be supplied, or the necessary consequences will be, that the land will return to a state of primeval barrenness. Wherever and whenever nature is left to herself, she abundantly restores what is drawn from the soil, for the support of the plants growing on its surface, by their decay, and as these plants absorb much from the atmosphere, a greater return is made and fertility ensues. This is the great process by which she is constantly operating in our forests and our pastures, and will account for the beneficial effects of the "enclosing system."

But, in order more fully to understand this, it is necessary to investigate the subject a little further. All plants, however differing in appearance or production, are composed of very few elementary bodies, viz: carbon, hydrogen, oxygen, and nitrogen. The three first only are required for all plants, and nitrogen is necessary only for the cruciform family. In addition to these a little salt is found in some, and a portion of the pure earths enter into the composition of most plants, as we before observed. Whence then arises this vast difference which we behold throughout nature, both in structure and appearance, and which is so manifest in every thing we behold from the humble plant

we tread beneath our feet to the lofty oak which decorates our forests? What is it that causes this varied appearance, which so delights us, and adds both to our comfort and our pleasure. Does it not almost exceed belief, when the fact is affirmed, that it is merely a combination of these few simple elements, in different proportions, that produces all this variety. Yet nevertheless it is so, and those which appear the most dissimilar, are very often nearly allied. Starch deprived of a small portion of its carbon, becomes sugar; and this last differs very little from gum in its composition; and it would be easy to produce many examples of the small difference which exists between the production of plants differing to all appearance in every respect. What then is the inference—surely that as these elements are necessary constituents of all plants, and as they can neither germinate or exist without them, that they must by some means or other, be supplied. Whenever nature operates alone, she never fails to furnish them, but when man steps in, and interferes with her arrangements, then it becomes his duty to supply all such deficiencies as exist, and this will be the aim of every good husbandman. Carbon and hydrogen are the chief constituents of all plants, and those substances which readily furnish these will be found to be most excellent manures. The dung of animals may be ranked as the best, because they not only contain these in considerable quantities, but are also easily decomposed and rendered soluble, and thereby fitted to enter into new combinations. Next to these may be classed green vegetable substances, which answer far better for this purpose, and contain more nutritive matter than the same plants after they have been suffered to mature and dry up. In confirmation of this we need only refer to the daily practice of our farmers, who never think of feeding their cattle on grass that had been gathered from the fields after it had matured and died. All know that no animal can live on such food, yet those very plants cut, whilst they are in a flourishing state, afford most wholesome and nutritious food. Analysis of green and dried plants (that is such as have matured themselves,) confirm this. The one contains sacharine or mucilageneous matter in considerable quantities, the other but little of these. There is also another reason why green vegetables form a better manure than dry. It is not only necessary that the substances required

for nourishing the crop should be present in the soil, but it must be in a soluble state. When dry litter is mixed with the duug of animals fermentation takes place, and the woody fibres are broken down and decomposed, but when buried alone, although they will undergo the same changes, yet the process is extremely slow, and the crop suffers for want of food, when perhaps there is an abundance in the soil, only not in that state in which it can be received by them, it may even be in excess, as in newly cleared ground, and yet the plants may suffer. It is therefore not only necessary that these substances should exist, but they must be in a soluble state, so as easily to enter into the composition of plants. No manure is in this state when first buried, unless it has undergone some previous change. Moisture and heat soon brings about an incipient fermentation, which progresses more or less rapidly according to the material or substances on which it is to act. Farm yard manure and green vegetables soon furnish nutriment from their decomposition, and therefore, (especially the first) are well fitted to be used for such crops as are of short duration, and require food in large quantities from the very commencement: woody fibres entering also largely into their composition, and these being more slow in their decay, afford nutriment at a later period.

It would exceed the limits of this essay for us to enter into an inquiry of the *modus operandi* of various manures or the soils for which they are best fitted, we will therefore confine ourselves to that of green vegetables. These act in two ways, first by protecting the soil, and secondly by returning to it a large quantity of those elementary substances derived from the atmosphere, which we have stated enters into the composition of all plants, and as they return more to the soil than they received from it, it follows of course that it is fertilized, and capable of producing a greater crop than it could have done previously. The object, therefore, should be to discover and make use of such plants only as will yield large returns, and these must be selected from those with broad leaves, for experience proves that all broad leaved plants draw less of their support from the soil than the narrow leaved. The reason is that the broad leaves of the one are so constructed as to absorb much from the atmosphere, whilst those with narrow leaves necessarily depend on their roots for their chief support. In

making a choice, we should select not only those which have large leaves, but as far as possible such as produce the greatest quantity from the fewest roots. All of these requisites will, we think, be found in the Pea family, and no doubt they are all well calculated for this purpose. But to show that practical results accord with this theory, we subjoin from our note book the substance of several conversations we had with gentlemen from North-Carolina and Virginia, on the use of the Cow-pea. We do not feel ourselves at liberty to give their names, as it would necessarily be without their approbation.

From Mr. B***** of North-Carolina, we learned that it was quite a common practice in his neighbourhood to sow the Cow-pea for the purpose of improving the soil, and that it had been attended with considerable success. The plans pursued were, either to sow broadcast over the field, or to sow them in alternate rows with the Corn ; in this case the rows of Corn were wider, but the number of stalks per acre were the same as they were planted closer on the row; the Peas were turned under for manure, and the succeeding year Corn was planted on those rows where Peas had been cultivated, and Peas were sown on those on which Corn grew.* By pursuing this plan the same fields were continued in the same culture without degenerating.

Mr. S******** of Virginia was acquainted with a gentleman who planted a piece of low ground, in Corn. In this field was a spot of high sandy land, which did not the first season produce a single ear of Corn, whilst the rest of the field was very productive. The next year this spot was planted in Cow-peas, they were very indifferent. It was however sown down with Peas for three successive years, and then planted in Corn, when it yielded as large a product as any other part of the field, although in the first instance it had not produced any thing.

Mr. B********* of North-Carolina informed us that he found the common Cow-pea a great restorative of fertility to land, and is used as a manure in the following manner: At the last ploughing of the Corn, the Peas are sown broadcast over the whole surface of the field, and covered by the plough; where it cannot be effected by this instrument the hoe is used. They are thus left and permitted to run at pleasure, no further attendance being bestowed on them. In the fall of the

year the Peas are picked, (some taking only as much as will serve for seed) and the hogs are turned in to glean what remains, but not permitted to graze too close. He was acquainted with a field which had been restored by this process, which by bad management had been so completely exhausted that it would not produce a crop of Corn, sufficient to repay the labour bestowed on it. The method pursued was exactly such as is detailed above, except that the vines were ploughed under in the early part of the winter, this course was pursued for five years, and it was found that the crop of Corn improved every year, and at the expiration of that time it was as great as it had ever been. His opinion was that Corn should always be planted flush, and thus kept, and that Peas should invariably be sown over the whole field at the last working, at the rate of one bushel per acre. This he thought would keep the land in good condition. He was informed by his nephew who resided some little distance from him, that one of his plantations which had been rented out for ten or twenty years, although reclaimed *lake land*, had become quite unproductive, in consequence of excessive cropping. The first year after he had undertaken the management of it, he cultivated it in Corn, which produced only ten bushels per acre, although the same quality of land usually brought about fifty bushels. Finding it so exhausted, he sowed the whole with Peas the same year, and early in the fall turned them under, and on this sowed a crop of Oats, which grew luxuriantly, and bore well. As soon as the Oats were cut he turned under the stubble, and again sowed it down with Peas. These in the fall he once more ploughed under, and sowed again with Oats, which were much superior to the first crop. They were cut, the stubble turned under, and Peas again sown; these were as before ploughed under, and the following spring Corn was planted, and the product was from fifty to sixty bushels per acre. Through the whole course his hogs were permitted to eat the pods off of the vines, but cattle were not allowed to enter his fields.

It will be seen from the above in what estimation the Pea is held in those States, and we cannot conclude without strongly recommending the course pursued by these gentlemen. We do not recommend it as the most eligible, but as being less likely to interfere with our present plans, and therefore more likely to be adopted. For our part we

would prefer sowing the whole of those fields which are not under cultivation with this vegetable, at the rate of about three bushels per acre, and turning the whole under in the month of September or October; having ourselves experienced considerable benefit from pursuing this course.

But should this plan be objected to, yet we have it in our power to manure our fields with green vegetables cultivated during winter, and therefore not interfering at all with our regular routine, and for this purpose we know of none which would answer better than some of the varieties of the common garden Peas. They may be sown in the months of November and December, and would be in full bloom by the first of April, at that time being from four to five feet high. We allude to the garden Pea more particularly because we have never cultivated the field Peas, but we rather suppose that they would answer fully as well if not better. The present price of seed would be a hindrance, but it is easy to purchase a small quantity for the purpose of raising a supply, and enough could always afterwards be reserved for that purpose. We throw out these hints with the hope that the attention of some of our readers may be drawn to the subject.

ART. VIII.—*Observations and Extracts on the Manufacturing of Indigo in Bengal; by* THOMAS SPALDING, Esq.

"Sapelo, June, 1829.

Dear Sir,—Believing it is as important to successful results in Agriculture, that erroneous opinions should be put down, as that the best modes, and the best practices should be recommended, I have taken some pains in extracting for you from the Asiatic Register, the Asiatic Researches, and Dodley's Annual Register, all that can be found upon the manufacturing of Indigo in Bengal.

The first is an extract from the Asiatic Researches, vol. 3d. from Colonel, afterwards General Claude Martine, a man who spent all his life in India: he details the ancient Indian mode of making Indigo, which to be sure is simple enough, like all the other agricultural operations of Hindostan, but the process could only have produced as much

Indigo as might be required for domestic consumption, but could have furnished none for export, as it did not. The American or European *mode*, as it is in some of the papers called, was then in its infancy, for it had only been introduced in 1784. Colonel Martine, whose opinions were altogether Indian, did not, and could not, foresee, at that early period, all the results that this change of process was to produce. The Asiatic Society took care, however, to reply to these observations of Colonel Martine, in the same page by an extract from the work of D. Cossigney, who shews the superiority of the new process over the old; these observations of D. Cossigney, are also extracted for your use.

On the Manufacture of Indigo at Ambore; by Lieutenant Col. Claude Martine, April 2, 1791.—*From the Asiatic Researches, volume the* 3*d.*

"I present the society with a short description of the process observed in the culture and manufacture of Indigo, in this part of India. The Ambore district is comprised within a range of surrounding hills of a moderate height: the river Pallar declining from its apparent southerly direction, enters this district about three miles from the Eastward, washes the Ambore Pellah, a small village, distant three miles to the southward of the fort of that name, situated in a beautiful valley; the skirts of the hills covered with the Palmeira and Date trees, from the produce of which a considerable quantity of coarse sugar is made; this tract is fertilized by numerous rills of water, conducted from the river along the margin of the heights and through the intermediate extent: this element being conveyed in these artificial canals (three feet deep) affording a pure and cristal current of excellent water for the supply of the rice fields, tobacco, mango, and cocoa nut plantations; the highest situated lands affording Indigo, apparently without any artificial watering, and attaining maturity at this season notwithstanding the intenseness of the heat—the thermometer under cover of a tent rising to 100°, and out of it to 120°—the plant affording even in the driest spots good foliage, although more luxuriant in moister situations. I am just retured from examining the manufacture of this article. First, the plant is boiled in earthen pots of about eighteen inches diameter, disposed on the ground in excavated ranges, from twenty to thirty feet long, and one broad, according to the number used. When the boiling process has extracted all the colouring matter, ascertainable by the colour exhibited, the extract is immediately poured into an adjoining small jar fixed in the ground for its reception, and is thence ladled in small pots into larger jars disposed on adjoining higher ground, being first filtered through a cloth; the jar when

three fourths full, is agitated with a split bamboo extended into a circle, of a diameter from thirteen to twenty inches, the hoop twisted with a sort of coarse straw, with which the manufacturer proceeds to beat or agitate the extract, until a granulation of the fecula takes place, the operation continuing nearly for the space of three fourths of an hour a precipitant, composed of red earth and water, in the quantity of four quart bottles, is poured in the jar, which, after mixture, is allowed to stand the whole night, and in the morning the superincumbent fluid is drawn off through three or four apertures, punctured in the side of the jar in a vertical direction, the lowest reaching to within five inches of the bottom, sufficient to retain the fecula which is carried to the houses and dried in bags. This is the whole of the process recurred to in this part, which I think if adopted in Bengal, might in no small degree supersede the necessity of raising great and expensive buildings : in a word, save the expenditure of so much money in dead stock, before they can make any indigo in the European method, to which I have to add that indigo thus obtained, possesses a very fine quality. As I think these observations may be useful to the manufactures in Bengal, I could wish to see them printed in the Transactions of the Asiatic Society.

Extract of a Treatise on the Manufacture of Indigo, by M. De Cossigney—" This experiment (the Indian process) infallibly shows, that Indigo may be produced by different methods, and how much it is to be regretted that the European artists should remain constantly wedded to their method or routine, without having yet made the necessary inquiries towards ascertaining perfection. Many travellers on the coast of Coromandel having been struck with the apparent simplicity of the means used by the Indians in preparing Indigo, from having seen their artists employed in the open air, and with only earthen jars, and from not having duly examined and weighed the extent of the detail of their process, apprehended that it is effected by easier means than with the large vats of masonry and the machinery employed by Europeans : but they have been greatly mistaken, the whole appearing a delusive conclusion from the following observation, viz : that one man can in the European method of manufacture, bring to issue one vat containing fifty bundles of plants, which according to their nature and quality, may afford from ten to thirty pounds of Indigo ; whereas, by the Indian process, one employed during the same time would probably only produce one pound of indigo : the European method is therefore the most simple, as well as every art where machinery is used instead of manual labour."

The next is an extract upon Indigo from a treatise on the profits of the husbandry of Bengal, taken from the

Asiatic Register, for the year 1802. This paper is important in many points, because it gives us the Indian mode of cultivating, and confirms our own mode of manufacturing. It shews us that this manufactory of Indigo, had under European enterprize, gone, in eighteen or twenty years, in Bengal, to great extent, and that the national want being supplied, the East-India Company had begun to withdraw its patronage.

On the Profits of Husbandry in Bengal. From the Asiatic Annual Register, for 1802.—" The manufacture of Indigo appears to have been known to India from the earliest periods. From this country (whence the dye obtains its name,) Europe was anciently supplied; until the produce of America superseded its market, and the Indigo of India was reduced to the home consumption. Within a very late period, the enterprize of a few Europeans has revived, for Bengal, the exportation of Indigo, which they have manufactured themselves. The nicety of the process, by which the best Indigo is made, demands a skilful and experienced eye. It is not from the practice of making some pounds, from a few roods of land, that competent skill can be acquired. But this was the management of the natives. Every peasant individually extracted the dye from the weed he had cultivated on a few cottahs of ground; or the manufacture was undertaken by a dyer, as an occasional employment connected with his profession. The better management of America in this respect, rather than any essential difference in the intention of the process, transferred the market to the Indigo of America; for it is well ascertained that the natural quality of Bengal Indigo is superior to that of North America. And although some labour be wasted in the process employed by the natives, or at least though the labour was not so well applied as in manufactures on a larger scale, the cheap price at which the natives nevertheless afforded it, would have preserved the market, had not the superior quality of Indigo, made at large manufactures, given to this a decided preference. The spirited and persevering exertions of a few individuals has restored this commerce to Bengal, solely by the superior quality of their manufacture: for no material change has been made in the culture, from the practice of the natives. Ground of no particular soil, but secure from probable inundation, is prepared as in the common husbandry, and sown in the broad cast, during the latter months of the hot season, and at the commencement of the rains. It should be weeded twice or oftener, and with no further labour, the early plant is ready to cut in the beginning of August, and the fields successively arriving at maturity, supply the works until the commencement of October. Other management has

been tried by throwing the land into furrows, and by sowing in drills, but without much success. One improvement, however, deserves notice, as it extends the season of Indigo—sowing early in the hot season, upon low lands, for a crop at the commencement of the rains before the inundation, or sowing late in the rains for an early crop in the following year. This has been introduced in the Western districts, where circumstances admit of experiments. In the Southern provinces, the manufacturers plant little themselves, but purchase the plant from the neighbouring peasantry, and the plant seldom yields produce beyond the year in which it is sown; while rattoons or lay-overs are preserved in the Western provinces to the second and even to the third year. Of the expense and produce it is not easy to determine an acurate estimate, many factories purchasing the plant by measure, others paying for the quantity of land, and others planting their own Indigo. The produce in different seasons is most widely unequal, and in the same season equal quantities of the plant afford very disproportionate quantities of the dye. However, it may be stated, that four rupees per begah does not ill pay the rent and culture; and the manufacturer need not be dissatisfied if he obtain six pound of the dye from each begah; at an expense of manufactures, including his subsistence, little exceeding the cost of the plant. The profit of the manufacturer depends on the quality of the indigo; and this is very unequal, proportioned to the skill of the manufacturer. Excluding from the consideration, Indigo of very superior quality, the medium price of Indigo sold for exportation cannot be taken higher than current rupees 140, or sicca rupees 120, per maund, which affords to the manufacturer a mere subsistence, from a speculation in which the expense is certain and the returns precarious. The fact confirms the estimate, for it is well known that little has hitherto been gained by the speculation.* The successful planters are few, and the unsuccessful numerous. The manufactory is nevertheless pursued with spirit: and not unreasonably, for experience may be expected to correct the errors unavoidable in new undertakings. The sagacity of ingenious men has greatly improved the process, which is still in the progress of improvement, for determining the most advantageous size and

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* Estimated thus on a manufactory calculated for 150 maunds (12,000) of Indigo, which may be superintended by one person:

Interest and wear of the works and stock valued at 12,000 rupees at 25 per cent. ($6000.)	3000	(1500 dolls.)
Two thousand begahs, at four rupees, (64000)	8000	(4000)
Expense of the manufacture including transport, and servants of the works, (2000)	4000	(2000)
Subsistence of the manufacturer, ($1500)	3000	(1500)
Sicca Rupees	18,000	(9,000 dolls.)

proportions of the steepers and batteries, for ascertaining with precision the period of sufficient fermentation and agitation, for drying the Indigo by artificial heat, and subjecting it to a process to prevent injury by worms, and for an arrangement to conduct the process with the utmost cleanliness, and with economy of labour, and without wastage. From an inconsiderable production, it has gone, through individual exertions, to an object of great magnitude, which by improved process may be expected to reward the enterprize which has established it. When Indigo had been introduced by private enterprize, it attracted the attention of the India company as an object of emolument to themselves; but after some years the controlling authority declared a more liberal policy. In pursuance of this professed intention, some relief was afforded in respect to duties; and the terms upon which the Company advanced funds for the provision of Indigo were made more favourable. But still they are so disadvantageous to the manufacturer, that none accept them unless urged by necessity in the default of other funds. But in the confidence of the professed intention of encouraging this production, numerous manufactories have been established in every district in Bengal. Not that the manufacturers so much expected particular aid, as they relied that where encouragement was professed, they might confidently expect to be undisturbed in the free exertion of their industry, and that general restrictions which might have prohibited the undertaking, were become obsolete, or at least, were superseded by the professed intention of encouraging a production which they well knew could not be raised by the sole industry of the natives: and consequently they inferred, that encouragement to Europeans was in the contemplation of Government. They reasonably looked to be relieved from some restrictions which were still enforced to their discouragement, but the event has contradicted expectation."

But an extract from the report of a committee of the House of Commons, of the same year distinctly shews, that the Government of England, thought they had done enough, and would do no more. This extract is also annexed.

'*Report of the Special Committee to whose consideration the Letter from Mr. Dundas was referred.*—" Indigo, as has been observed above, is already carried to an extent, that nearly suffices for the consumption of all Europe. The Company, after advancing the funds to give a solid establishment to this manufacture, left the whole trade in it to individuals for whom it is brought home in the Company's ships, usually at a war freight of only 22*l.* 10*s.* per ton, which is less than they pay the ship owners; and being comparatively of small bulk for its value, can in no great way enhance the occasion for private tonnage. The un-

dertakers in it have actually suffered severely from too rapid an increase in the manufacture, and too eager a competition to push this article, therefore, further at present by encouraging new adventures in it, would be unjust to those who are yet hardly emerging from their difficulties; and on the general principles of trade, it would be evidently impolitic: but if on fair investigation, any further reasonable encouragement shall be found necessary for the culture of this article or for bringing it to Europe, there can be no difficulty in according it."

There is a table connected with this extract, which gives us as well the product from the soil, upon a large scale, as the profit of manufacturing.

This table shews, that the manufactories generally cost 12000 rupees, or $6,000, that they take off the product of 2000 begahs, or about 660 acres, that these 660 acres give 150 maunds, or of Indigo 12000 lbs. That these 12000 lbs. of Indigo, are worth to the manufacturer but 9000 dollars.

Now according to the information of both Gen. Floyd, and Major John Scriven, of Savannah, the two last Indigo planters of Georgia, 300 acres of land, would give with a moderate crop, from 12,000 to 15,000 lbs. of Indigo. More than double the amount of the Bengal product. Nor will this surprise, when you remark, that instead of the drill husbandry, the broadcast is employed upon Indigo; the drill husbandry had been tried but abandoned, the writer does not explain why, but the same paper from which this extract is made, when treating upon rice, gives this explanation. Rice is also sown broadcast, after the land has been ploughed, harrowed, and watered; rice requires at least one weeding, and this weeding takes the labour of twenty persons to the begah, or sixty persons to the acre. This employment of sixty persons, to weed an acre of land, would be incredible to us, if we did not know that the Hindoo sits down to all his labours, in fact his weeding hoe from the acute angle, the blade makes with the handle, can only be employed by him in a sitting attitude. The same weeding of an acre of rice in Carolina, would be accomplished by two persons: and though labourers are cheap in Bengal, that is 1 or 1½d. sterling, yet 1½d. multiplied by 30 is 45d. equal to 85 cents, for the weeding of half an an acre of land, which would be accomplished by a single labourer, in a single day, costing from 50 to 75 cents. Now, can we in truth, apprehend any

thing, from an agriculture so conducted, if our minds, and our hands, are left untrammelled by legislation ?

(To be continued.)

ART. IX.—*Account of Coolridge's Rail Road and Canal Earth Cart ; by* JAMES G. HOLMES.

(Communicated by the South-Carolina Agricultural Society, for publication in the Southern Agriculturist.)

To the SOUTH-CAROLINA AGRICULTURAL SOCIETY.

Gentlemen,—Last summer, at Lowell, in Massachusetts, I witnessed the operation of the Rail Road and Cars, referred to in the subjoined Report. Having been much pleased with the simplicity, cheapness, and efficiency of the plan, I preserved the Report, and believing that it will be valuable to all who are compelled to remove earth to a distance, I send it to you. Many of you are rice planters, some of you may send wood to market, and it will, to such be particularly useful.

As the mode of constructing the road and the Cars, and the manner of hauling, is not particularly described, and as we are more accustomed here to speak of the cubic yard and of the running yard, than of the square and of the rod, I have, to save you the trouble of calculation, reduced the work performed to these measures, and attempted a description of the Road and the Car, that will, I hope, be understood. I shall, at all times, be happy to give such further explanation, as may be desired.

The Road was made by placing planks two inches thick, and twelve inches wide, flat upon the earth, in parallel lines, for the track of the wheels of the Car. The ends of the plank were brought together with square joints. Where the earth was so wet, as to render it probable that the plank might sink into it ; pieces of plank or scantling were placed in the earth transverse the road, at convenient distances apart from each other, to support the rail. Some pains was taken to level the earth. I did not observe whether there was or not any inclination of the plane. It is obvious, however, that a plane descending in the direction that the loaded Cars are to be carried, is to be preferred.

As a general rule, the angle of the plane should be such, that in hauling back the empty Cars, nearly as much power should be required as to haul down the full Cars. This will enable you with a given power to perform the greatest quantity of work of which that power is susceptible. There is no difficulty in keeping the wheels in their track. The horse will keep the centre of the road between the planks. And if these be sufficiently near it will be scarcely possible that the wheels should run off. The turns of the road should not be angular. But they may be the requient of a circle of even small radius. The Cars being attached to each other by a connexion turning on a centre semi-distant from the axle-trees of each car. The wheels will necessarily track. This ingenious method of causing the wheels to track is pointed out in the Rail Road Car of Dr. Howard.

The Cars at Lowell differed from the hand carts of porters in nothing but the construction of the body. This was made in the shape of a mill-hopper. The bottom opened on hinges attached to the back of the body, and was fastened by two levers which were attached to the bottom and rested in front on the cross piece that connects the shafts, and which for that purpose projected a few inches on both sides beyond the shafts.

By throwing off their levers the bottom opened, and the earth was discharged. Each Car, except the front, was attached to that preceding, by means of the cross-piece that connected the front of the shafts, being hooked on to iron pins in the back of the Car preceding. The front Car had ordinary shafts, and was drawn by the horse.

The work of a labourer in filling the Cars and placing them on the rail was on an average per day 10 squares or 432 cubic feet, equal to 16 cubic yards.

In eleven hours one horse removed to the distance of 100 rods or 550 yards, 2160 cubic feet, equal to 80 cubic yards.

To excavate and remove to the distance of 550 yards, eighty cubic yards of earth per day, will require one horse and one driver, and five labourers to dig and fill, making six men and one horse. This would each day make a bank of 20 feet base, 6 feet elevation, and 4 feet width at top, and 30 feet long.

An acre of land dug out only 3 feet deep, would supply earth for such a bank 1815 feet long.

There should be two Cars to each spadesman, that would be ten; there should always be one spare Car for every ten, so that the work would not be delayed by the time taken for repairs of the Cars.

These Cars might cost, if imported, twenty dollars a piece, for how much less they may be made at home I do not know.

550 yards, or 1650 feet, the length of the supposed rail, would require 3300 feet of plank 12 inches wide, and 2 inches thick. Reduced to board measure, it would be double, viz: 6,650 feet, to which add for waste, &c. ¼ or 25 pr. cent. gives 8250 feet of plank, at $8 pr. M. is $66. The outfit, therefore, would be, Road $66, Cars $220—total $286. Respectfully,

JAMES G. HOLMES.

Extract from the Official Report of a Committee of the Massachusetts Agricultural Society.

George Coolridge, of Watertown, produced a Rail Road and Canal Earth Cart, invented by him, and now in use at Lowell; it was also used last summer in making a road in East Sudbury. One man with the Cart excavated and removed on an average ten square or four hundred and thirty two cubic feet of earth per day. At Lowell the Carts are moved by horse power; and in digging a canal one horse in eleven hours removed ten squares of earth, two hundred and sixteen feet to the square, carrying the earth one hundred rods. At the same place three horses in one day removed thirty squares, measuring six thousand four hundred and eighty feet, or three hundred and fifty tons; for the same work, at the same place, it required twenty-four yoke of oxen and twelve drivers. Mr. Coolridge uses a temporary rail way as he terms it, made of pine or spruce plank two inches thick, and in his written statement says one man with his cart can remove more earth in one day than a man with a cart and four oxen can drive twenty rods and discharge in the same time. The body of the cart examined by the committee will hold ten or twelve cubic feet; it is formed under the axle, and the bottom opens to discharge the load. To Mr. Coolridge the committee award twelve dollars.

PART II.

REVIEW.

ART. I.—*Essays on the Management of the Dairy; including the modern practice of the best Districts in the Manufacture of Cheese and Butter. Deduced from a series of observations made during thirty years' practice; by* J. TWAMLEY, and Others. London, 1816.

(Continued from page 209.)

THE utensils of the Dairy consist of "pails, seives, bowls, creaming dishes, skimming dishes and churns." Nearly all of these were formerly made of wood, and even now some of them are necessarily so. But whenever metal and earthenware could be obtained, they have of late years been preferred, as they look neater, are more easily cleansed, and keep the milk cooler. Lead, copper and brass, and also those earthen vessels which are glazed with lead, should be excluded from the Dairy, as the acid of milk has a tendency to dissolve these, and form with them a compound of a very dangerous nature. Those made of cast iron, softened by annealing in charcoal, are said to possess many advantages over all others. These consist in, 1st, their durability, "they are softened by annealing in charcoal to such a degree, that though they should fall on a stone they will not break, unless dropped from a very great height; further they are turned smooth inside, and then laid over with a coat of tin to prevent the iron from coming in contact with the milk, the acid of which would corrode and injure it." 2dly, they preserve the proper degree of coolness better, so that it is affirmed that *one third* more of cream is obtained from an equal quantity of milk, and 3dly, they are more easily kept clean.

The greatest degree of cleanliness must be observed in every operation connected with the Dairy, the apartments and utensils must not only have the appearance of being clean, but must be actually so, and the eye will not alone be able to judge of this, every thing which produces the least odour must be carefully removed, and all acidity must be neutralized. Few duly appreciate this, or carry it to the extent to which it ought to be; yet should either the pails, strainers, or pans, have the least acidity in them, it will act like leaven and serve to bring on a premature change, and consequently will lessen the quantity of cream, and

render that which is obtained of an inferior quality. Our author observes,

"The importance of cleanliness, in every thing belonging to the Dairy, cannot be sufficiently impressed upon the minds of all who are concerned in its management. Hence, none of its vessels should, on any account or pretext whatever, be scoured in the milk house, but in the scullery or wash-house, appropriated to this purpose; as the steam arising from the the hot water, will injure the milk. For the same reason, where cheese is made in the same Dairy (as sometimes is the case,) no cheese, cheese-press, or rennet for coagulating the milk, should be suffered in, or even near the milk-house; as the atmosphere will invariably become tainted with the acidity arising from the whey and curd. In order to preserve the milk-vessels sweet and clean, the following circumstances demand particular attention.

As soon as the cream is separated from the milk, the dishes should be carried out of the milk-house, and instantly emptied, and the skimmed milk be applied to its destined uses. Immediately after the dishes are emptied, they must be thoroughly washed with scalding hot water, which should be kept in readiness for that purpose, and scrubbed with a brush of a proper construction. Where other materials cannot be procured, this may be made of a bunch of wire, firmly bound together; but the stumps of an old heath-broom, after the small twigs have been worn off, will answer this purpose remarkably well; and this, in fact, ought to be used wherever it can be had, being both firm and tough, so as to do the work properly and efficiently. In the preceding observations, *wooden vessels* only are intended: but if any persons should persist in using leaden or glazed earthenware vessels, these must be scalded in like manner, and scrubbed very carefully with salt and water."

After this operation they must be carefully rinsed in warm water, wiped dry, and exposed to a fire or the sun, that all moisture may be speedily evaporated.

"Should, however, the milk have been suffered, at any time, to remain so long in the dish as to become sour, the wood instantly becomes tainted with that acidity, so as to act like leaven upon any milk which may afterwards be put into it, and which never fails to coagulate without separating any cream: hence it cannot be employed in making either butter or cheese, and is consequently lost in the Dairy. The scalding above described is by no means sufficient to remove this destructive taint; and, as the dishes are totally useless till that be removed, the following more efficacious process must be adopted.

Fill the vessel with water scalding hot, and put into it a considerable quantity of hot ashes and small red embers from the fire: stir it about frequently, scrubbing it well in every part with the scrubber. Let this remain a considerable time; then empty the dish, scrub it as usual with scalding hot water, rinsing it well first with hot and then with cold water. Then fill it to the brim with cold water, the effect of which will be better, if it can be made to run into the vessel in a continued stream, and flow over the brim: in this state, let it stand for ten or twelve hours, or longer, after which it may be wiped and dried, when, if the taint be not very strong, it will be fit for use.

If the ashes of the fire should happen to contain very little salt, this operation may perhaps not prove effectual. In that case, a small proportion of potash must be added to the embers, &c. or quick-lime may be employed together with the pot-ashes, which greatly adds to their cleansing power. But in all cases, where recourse is had to this process, the utmost care must be taken, that the dishes be well cleaned by the rubber at each time; and that cold water be allowed to stand in them for a considerable time, which

should be frequently changed, in order that the whole of the salts may be extracted before the vessels be used again."

Having provided a suitable building and proper utensils, the next thing to be attended to, is the procuring of good milch cattle. Unfortunately for us, so great has been our neglect, that our very best, would be ranked among the inferior in other countries. At present we have no remedy for this, and can only select from those we have, which, notwithstanding their mean appearance, and actual inferiority, will, with proper care make a profitable return. Even here we have a great choice, and they ought not to be taken promiscuously.

"The selection of proper cows for the Dairy is a point of very great importance. Among this class of animals, it is found, by experience, that some kinds give milk of a much thicker consistence and richer quality than others; nor is this richness of quality necessarily connected with the smallness of the quantity yielded by cows of nearly an equal size. The Dairy owner, therefore, ought to be peculiarly attentive to this circumstance. In judging of the value of a cow, the quantity and quality of the cream produced from her milk in a given time, ought to be considered, rather than the quantity of the milk itself; and this quantity and quality of the cream produced varies in different breeds."

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"In the first place, as there may be individual cows among a great number, which yield milk possessing qualities extremely different from those generally belonging to that breed, although to the eye and taste it may not appear to differ from them in any respect, *it will be necessary to ascertain the qualities of the milk yielded by every individual cow, as soon as she is turned into the Dairy.* For this purpose, we would recommend it, as an invariable practice in every Dairy. to keep each cow's milk separate on the first day of every month, at least, throughout the year, in order to ascertain the quantity and quality of milk yielded by each individual cow.* Without this precaution, it is possible for a Dairy farmer to be going on for years together, and never know that he is subjecting himself to a great expense daily, without deriving any return whatever for it. Various other advantages will result from the adoption of the practice here recommended: for, not only may the milk of one cow be, upon the whole, of a much inferior quality to that of another, and yield a much poorer return, which might thus be discovered; but it may also happen that, from casual disease, or other circumstances, the milk of one cow may become tainted at a particular time with a peculiar taste, or other quality, which may greatly injure the whole stock of milk, if mixed with it, and occasion loss as well as other unaccountable inconveniences, which, by attending to the above caution, would be avoided. Besides, he will thus avoid the danger of being induced, with that hasty decisiveness which is but too frequent in rural affairs, to attribute the effects which arise from this unsuspected source, to other circumstances that have had no influence whatever upon it. Another advantage, not less important than the preceding, which would result

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*In comparing the milk of two cows. in order to judge of their respective qualities, particular attention must be paid to the time which has elapsed since their calving; for the milk of the same cow is always thinner, soon after calving, than it is afterwards; as it afterwards gradually becomes thicker, in proportion to the time since the cow has calved. The *colour* of the milk, however, soon after calving, is richer than it subsequently becomes; but this, especially for the first two weeks, is of a *faulty colour*, which ought not to be desired.

from the practice of keeping separate, and examining, each cow's milk, would be the rapid advancement of the *practical knowledge of the Dairy:* for thus, many circumstances would be disclosed, which are of great importance to the profit of the owner, but which are not at present suspected; and which, consequently, cannot otherwise come to his knowledge."

Those who intend only to supply their families, will scarcely be induced to bestow more attention on their cattle than will ensure this; but those who desire to derive profit from their Dairies, should be careful in their selection, and should keep in view the improvement of the breed, and let them rest assured that they will be fully recompensed for their labour, should their management be judicious. By crossing, it is in the power of the breeder to arrive at almost any point he may desire, whether it be to increase the quantity of milk, its richness, or add flesh to any particular part of the animal. This is conducted with considerable skill in England, where it seems to be better understood, and more extensively acted on, than in any other country, and where the animal appears to be almost at the command of the breeder, and to assume such shape and character as he directs. Certain it is, that since the days of Bakewell, (who may justly be considered as the author of this system of breeding) very great changes have taken place, which have resulted in producing the happiest effect.

The various breeds are kept very distinct, as they respectively possess qualities which render them more suitable for one purpose than another; some giving large quantities of milk which yield very little cream, whilst others give less milk, but from which much cream is obtained; others again are only fitted for the grazier. At one time it was thought impossible to unite the two qualities of giving large quantities of milk, with a disposition to fatten; but this desirable object has of late years been obtained in what is called the "Improved short horns," a breed which not only yields very large quantities of the richest milk, but also fatten readily, and to a great weight. They are worthy of all the commendation bestowed on them, and that our readers might judge of this, we could select many instances on record of their extraordinary qualities. We content ourselves with stating on the authority of the Rev. Henry Berry, the properties of ten belonging to J. Whitaker, Esq. One of these gave *four gallons and three quarts twice each day.* Another four gallons and two quarts, twice each day; three others, four gallons; and none of the remainder less than three gallons, twice each day. Nor is this breed less remarkable for the quantity and quality of the cream they give—from some of them upwards of twenty pounds of butter per week have been made. They have been introduced into this State, as well as the Devons, (perhaps two of the best breeds of England) but have not been sufficiently long among us, for any just estimate of their merits to be formed, and it remains to be seen whether they will be able to retain

their high reputation in our Southern climate. We are aware of the prevalence of the opinion that these animals degenerate with us, but we believe it to be as well founded as was that which at one time was so universal in Europe, and which is believed at this day by many there, viz: that *all* animals, (not even excepting man) degenerated in America. No one thinks now of seriously refuting this, and we laugh at the European for his credulity, but have we any better reason for our belief, that cattle imported into the Southern States, do degenerate, and are we not subjecting ourselves to ridicule by acting on this opinion. It cannot be inferred from analogy, for not only do horses, hogs and sheep, maintain their good qualities, but their breeds have been improved whenever attention has been bestowed on them, and of each of these animals we know facts which warrant us in stating this. Nor can we arrive at this conclusion from any facts, (with which we are acquainted) for wherever proper care has been bestowed, and enough of wholesome and nutritious food been allowed, we have never witnessed any falling off. We are clearly of an opinion that it has been owing to the little care bestowed, and the want of proper management on our part, that such unfavourable results have occurred in some few instances, in which attempts have been made to introduce improved breeds. We have thought it sufficient to purchase and bring on our estates a few fine animals, and when we had done that much, we have thought that we had performed our part, and they have been left to seek for their food in worn-out fields, (which we have honoured with the name of pastures,) where the whole supply of herbage was not equal to the maintenance of one half of those who were to subsist on it; or they have been turned into our woods and swamps, to forage with our native cattle, who all their lives have been used to no better treatment: can it be wondered at that the project should end in disappointment. Before we undertake such an enterprize, we should mature our plan, we should have proper buildings and proper food, and attendants to provide these, and take care of them, and our arrangements should be such that they would never be obliged to resort to the old-fields or swamps for their food, but at all times have an abundance near at hand. This may be objected to on account of the expense and trouble which must necessarily be encountered, but from what can we derive profit without labour. Our only inquiry ought to be, can we derive a sufficiency after deducting all expenses, to recompense us, or will the profit be as great from this as from other pursuits. Of this each can best judge for himself, and with those interested we leave it, only cautioning them against drawing hasty conclusions.

If it be deemed advisable, after mature deliberation, to attend to the Dairy with a view of making it a source of profit, we would

recommend the introduction of some of the improved breeds of England, which can be obtained in several of the Northern States. From these they may be propagated in their purity, or at any rate our native breed may be greatly and speedily improved. We advise this, because it will be long, very long, before we can produce any thing purely native which can enter into competition with even the inferior animals of those improved breeds, and as time is money, and as moreover it will make a considerable difference whether a Dairy be composed of cows giving from three to eight quarts per day, or from twenty to thirty, or produce from three to six pounds of butter per week, or from twelve to twenty pounds, we cannot but think, that those who wish to undertake it as a source of income, will act wisely to have their Dairies composed of these latter, although the prices which are demanded for them now, may be considered by many as very extravagant. But in recommending this course, we do it on the supposition that the proprietor will bestow every necessary attention on them, and provide them abundantly with food, for if such be not his intention, he had better by far rely on those which we already have, and which being used to such treatment will not suffer so much from such neglect, and from which a reasonable return may be expected, depending, however, in a great measure, on the care and attention bestowed on them.

We now proceed to "the general management of the Dairy cows." The Scotch have a proverb that the cow milks by the mouth, thereby intimating the necessity of providing her with an abundance of such food as she relishes, for without attention to this it will be in vain for us to expect a large return, and we ought not only to supply her with food whilst giving milk, but also when dry and with calf. She should always be kept in good condition, for it is bad policy ever to permit cows to get low in flesh. With respect to this our author observes,

> "The quality of cows' milk greatly depends on the nature of their food, which likewise materially affects the quantity they will yield. Hence, the choice of their food is an object of prime importance."

And again,

> "In order to derive abundant profits from the Dairy, it is necessary that the cows be kept at all times in high health and good condition; for, if they ever be suffered to fall very low during the winter, it will be impossible to obtain an abundant supply of milk, by bringing them into high condition in the summer. Hence, if a cow be lean at the time of calving, no subsequent management can bring her to yield, for that season, any thing like the quantity of milk which she would have furnished, in case she had been kept throughout the winter in good condition. During that inclement season, therefore, she should not only be supplied with abundance of nourishing food; but should also be kept dry, warm, and clean, by currying or brushing them."

No one in these states can have the slightest excuse for not providing food for his cattle, nor are we obliged, as in colder

climates, to resort to all the make shifts which are there practised. We can, if it be our wish, supply our cattle with green food from January to Jannary, and this without any extraordinary exertion on our part. In addition to what we may be able to procure from our fields, we can raise the carrot, cabbage, the common turnip and the ruta baga, and have these growing with the greatest luxuriance all winter, and fit for use from the month of October to the month of April : to these may be added, oats and rye, the last of which may, under good cultivation, be fit to cut in March, and will be succeeded by the oats.—But we need not even resort to these—there is a species of native grass (the name of which we have not been able to learn as yet,) which springs up early in the fall, and furnishes a most luxuriant pasturage the whole winter. We have had a small quantity of this grass under cultivation for several years, and do consider it almost invaluable. It is perennial, and so hardy that when once it is sown neither crab, joint, or nut-grass, can injure it. Of its value for furnishing a winter pasturage, our readers may judge, when we state that during one winter (the only one we kept any memoranda of it) we cut it in November, being about eighteen inches high, and about every ten weeks after, until the beginning of June. This, however, was a small quantity planted in our garden, and will only serve to show how valuable it may be made. When sown on poor land it has never yielded more than one, or at most two cuttings, but even then it would make an excellent pasture, as it shoots with considerable vigour when either eaten down or cut. The Orchard grass will also furnish good winter pasturage, but we cannot speak of this grass from our own experience, and know not whether it can withstand our hot summers, and the numerous weeds which spring up then.

Although we may provide the food, yet unless we are careful in its distribution, and exercise some judgment in the management of our cows, there will be not only waste, but the product will not be as great as might be expected. The following remarks are deserving of attention.

"To make the cows give abundance of milk, and of a good quality, they ought at all times to have plenty of food. Grass, especially such as springs up spontaneously, on good sound meadow land, is, in general, deemed the best food for cows that are kept for the purposes of the Dairy. If the temperature of the climate will permit them to graze at ease throughout the day, they should be suffered to range on such pastures at freedom; but, if they should be so much incommoded by heat as to be prevented from eating through the day, they ought, in that case, to be taken into cool sheds for protection ; where, after allowing them a proper time to ruminate, they should be supplied with abundance of green food, fresh cut for the purpose, and given to them frequently, and in small quantities, so as to induce them to eat it with pleasure. When the heat of the day is over, and they can remain abroad with ease, they may be again turned into the pasture, where they should be allowed to range with freedom all night, during the mild weather of summer. But, as the driving of cows to a distance, from one

pasture to another, materially affects the quantity and quality of milk, the cow-sheds should be placed as nearly as possible in the centre of the farm: and, as the cows will feed more leisurely, and consequently, more profitably, when confined in proper inclosures, the pastures ought to be well sheltered and inclosed.

For the winter season a different system may be adopted: 1. The cows may either be kept in stalls, and supplied there with food; or, 2. They may be kept in warm sheltered yards, furnished with open sheds, in which they can feed without being exposed to the severity of the weather; if thus kept warm, they will consume less food, and thrive more, than they would if suffered to shiver with cold."

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"But the attentive Dairy-owner will not satisfy himself with providing hay only, or any other kind of dry food in winter; he will further take care to keep his cows in good condition after the grass fails, and when they are, for the most part, yielding little or no milk, by giving them turnips, carrots, steamed potatoes, or other nourishing and succulent substances, together with their dry food; and he will likewise continue to give them the same nourishing food, if he can command it, even after they have calved.* For, though turnips and cabbages will impart a taste to the milk, if the cow be fed *chiefly* upon them, yet, if she only have enough of them to keep her in good condition, such taste will not be sensibly experienced; and if it were, it would prove no detriment where calves are reared. Should it even be otherwise for a few weeks early in the spring, it will not be of any material consequence; for, the products of the Dairy being then scarce, they will always find a market; and the superior quantity of milk, yielded in consequence of this attention during the ensuing season, will more than balance a small diminution in price at that season † From these considerations, a judicious Dairy-owner will always take care to provide some kind of food more nourishing than hay, to keep his cows to their fullest stretch of milk, from the time of their calving till grass can be had in abundance."

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"Cows, however, not only require the very careful management above detailed, during the winter, but the same attention must be continued during the summer, if a *full return* be expected from the Dairy. If they be constrained to go on pastures where their ordure has been dropped, they may seem to enjoy an abundance, while they, in fact, are suffering a degree of want which will materially reduce the quantity of their milk. In like manner, if the grass be allowed to attain a considerable length before they are turned upon it, much of it will necessarily be trodden down by them, and will speedily acquire a putrid taint, which they nauseate, and a similar effect will be produced. The same thing will be experienced, if it be permitted to get into stalk. If the day be hot, they are incommoded by it,

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* Carrots or potatoes given once or twice a day, together with other sorts of green food, will be profitable: but no Dairy-cows will pay, if fed entirely on these. A middling-sized cow will eat from one to two hundred pounds of cabbages, or turnips per day; but seventy to one hundred pounds with straw, are supposed to be as much as her produce will pay for.

† In general, however, this taste may be removed by the addition of one eighth part of boiling water to the milk before it is poured into the creaming dishes. The addition of a small quantity of saltpetre, it is now pretty generally known, to the milk while warm from the cow, will likewise remove the disagreeable flavour arising from feeding on turnips. The same effect will also be produced by warming the cream, and afterwards pouring it into a vessel of cold water; from which the cream is to be skimmed as it rises to the surface, and thus the unpleasant taste will be removed.

and cannot feed, and flies distress them; and, should the night prove wet and cold, they are chilled by it. All these are sources of annoyance, which if not attended to, and guarded against, will infallibly diminish both the produce and the profits of the Dairy. Hence, care should be taken to provide them with a shelter, where they can remain cool through the day, during summer, and free from any annoyance. In this situation, they ought to have fresh and succulent grass, of the sweetest kind that can be procured, cut and laid before them in small quantities, fresh and fresh, as long they will eat of it: the surplus of what they refuse to eat should be removed from their stalls, so as not to suffer them to breathe upon it to nauseate it; and then they should be left quiet, to ruminate at their ease.

A more economical, and consequently more profitable mode of feeding cows, is to keep them continually in dry and sufficiently airy stalls, and there supply them with different kinds of food*, always fresh and clean, and, (lest they should loathe it,) as much as possible free from the *touch of the attendants*, allowing them to take exercise in a dry, airy, but sheltered yard. In this case, however, they must be kept very clean by combing and dressing; otherwise, their legs will swell, and their health must necessarily suffer."

The stall feeding or soiling of cattle has been objected to as unsuitable for our climate, but where sufficiency of food is provided, we believe it will be found fully as profitable, if not more so than any other. The best cows we know of are treated in this way, and the most profitable Dairy in the Southern country is thus managed: the cows are never turned out into the pasture but are kept up both summer and winter, and have all their food given them in their stalls: they have a yard into which they are at liberty to stroll during the day, but they are not turned out of this for any purpose, their water even being conveyed to them there by a trough. This system has been pursued for at least six years, and has been found profitable.

(To be continued.)

SELECTIONS.

Art. I.—*Castor Oil.*

Extracts from a Letter from Dr. Robert R. Harden, *of Georgia, to* Gideon B. Smith, *of Baltimore.*

[from the american farmer.]

"Oil, as pressed from the bean, is pure, saving a degree of moisture natural to it, and such foreign substances as may get

* Varying the food of cows from time to time is very beneficial to them, from the additional relish with which they eat, which cannot fail profitably to influence their produce.

in it during expression. There is no mucilage in it. As it is expressed, it will not keep, because it has water in it; it cannot be boiled to clear it of foreign substance, because there is so little water in it that it will burn. Now, observe the whole secret of clarifying is, to clean it of the foreign matter it receives during expression, and to free it entirely of water. All we hear of mucilage is a mistake; there is none.

"The processes I have used are as follows: Take the Oil as expressed; put a little oil of vitriol in it; agitate it powerfully; then throw in powdered chalk to neutralize the acid; let it settle, and it will be clear. 2d. Put the Oil in an open vessel; cover it with finely powdered chalk; sprinkle some oil of vitriol on the chalk, and it will cause the chalk to sink to the bottom, the Oil being left clear. Now, in both these processes, oil of vitriol, although itself a fluid, has the property of taking the water from the Oil, the chalk combines with it, forming the *plaster Paris*, which settles to the bottom. In this way the most of the North-Carolina Oil is made. But the Oil thus prepared is not as good as the next plan I shall describe; the taste is injured, and I think the effect injured also besides, it takes time, and in the large way must be tedious.

"We will suppose we have sixty gallons of Oil to clarify, and a still that will hold sixty gallons. Put one half in the still and fill with water; as the Oil cannot be burned while water is in it, put a strong fire and start it to boiling gently; a quantity of dirty scum will soon rise; skim it off as fast as it rises, and so continue till no more will rise, taking care to keep it from boiling over, adding more water now and then, that it may be kept full, for greater convenience in skimming. After a while the Oil will become perfectly clear, and a beginner would think the work done; but he will soon find his mistake. When the Oil is perfectly clear, and no more scum will rise, set a barrel on two benches eighteen inches or two feet high, the bung being up; dip up the Oil and pour it into the barrel; fill up the still with water now and then, for greater convenience in dipping out, and avoid dipping any, or as little as possible of water with it. Now fill the still with clear water, and treat the other half in the same way; when clear, put it in another barrel fixed as the other, unless the first will hold it all. The still should now be made perfectly clean. As soon as the Oil in the barrels becomes cold, it will lose all its transparency, become opaque, thick and look dirty; it will look very bad. Now bore gimblet holes in the bottoms of the barrels, and a quantity of water will run out; let it run till the oil begins to run out; then stop the holes. Water will continue to collect in the bottoms of the barrels, and should be let out in this way for two or three days, or till no more water collects. It is a matter of consequence that every particle of water that can be let out in this way should be got

rid of, as it saves much time and labour. When all the water is in this way discharged, put the whole of it again into the still, (observing that the still must not be hot, or it will take fire with alarming violence;) and make a slow fire of green wood, that a steady heat may be kept up; the still should be kept even full, or nearly so, dipping out some when in danger of running over, and adding more when it settles down. A scum will soon collect on the top, and the Oil will become very clear; skim off as fast as any scum collects until no more will rise. Now sprinkle in, little by little, three or four quarts of good wheat flour, stirring it with a long stick at the same time. Now once more a scum will rise as fast ever; it should however be stirred for perhaps ten minutes; the Oil, as soon as the flour is put in it, will become *beautifully clear;* now skim off this last scum as fast as it forms, and as long as it continues to collect; when no more collects, the oil is nearly done; it will look beautiful, and be almost without taste or smell. As it is nearly clear of water the fire must be attended to, or it will burn. Dip some out in a vial, hang it in the air; when cold, if it be clear, it is done; if it become opaque the fire must be continued. In this way keep trying with the vial till it continues clear when cold; and then, to be sure, it would be well to keep a slow fire under the still for five or six hours longer. When it gets perfectly cold, if it be clear, it is done; if it become opaque, the fire must again be started under the still, and kept up till it is clear. Then strain it through a bag made of several folds of blankets; put it in barrels and bung it up tight. If the barrel has the least moisture in it, the Oil is spoiled. Oil prepared in this way is perfectly pure; it is as pleasant tasted as Olive Oil. Why wheat flour has such an effect, I will not attempt to explain; but certain it is, I know of no other way to make good and pure Oil. You will observe, the whole process is, to deprive it of all foreign substances that get in it during the process of expression, and to remove every particle of water from it.

"To prove I am correct, try this experiment: fill a vial with one half good Oil and the other half warm water; shake them together well and the Oil will become opaque; hang it up before the fire till the water boils, and the Oil will become clear; let it get cold and the Oil will again become opaque; let it hang three or four days and hang it before the fire; keep it for some time only warm, and it will continue clear when cold; again hang it before the fire and let it boil; when cold it will again be opaque. When only warmed before the fire, all the water in the Oil evaporates; but let it boil, and the steam passing through the Oil leaves a moisture in it. Take bad oil, add some wheat flour to it and hang it before the fire; as it cannot be skimmed, when cold the filth will settle to the bottom and the oil be beautiful. This experiment will prove that the white colour does not

depend upon any mucilage in the Oil; it is only the effect of Oil and water uniting."

"N. B. All the scum that is skimmed off should be put in a pot and boiled awhile; then suffered to get cold and poured into the next Oil to be clarified; boil it till it gets clear; the dirt will settle."

ART. II.—*Outlines of Horticultural Chemistry:—Vegetable Physiology.* By G. W. JOHNSON, Esq. of Great Totham, Essex.

[FROM THE GARDENERS' MAGAZINE.]

(Continued from page 164.)

IMMEDIATELY beneath the bark is situated *the wood*, which forms the chief bulk of trees and shrubs. It is formed of concentric layers, one at least of which is added annually. These layers are formed of a tissue of longitudinal fibres, resembling network, the interstices of which are filled up with soluble matter, differing in each vegetable genus, but closely resembling its parenchyma. The layer immediately in contact with the bark, is the softest and palest in colour, and thence is called *the alburnum*. It is in this that the vessels which convey the sap from the roots to the leaves are chiefly situated. This layer is annually renewed, that of the previous year becoming more complete wood. Although the chief part of the sap vessels, as just observed, is situated in the alburnum, yet others, though more scanty, are dispersed through the whole of the wood. Wherever situated, they extend from the extremity of the minutest root to the leaves. The idea that the annual layer of wood is rendered more dense and firm by severe winters, is denied by reason, and demonstrated to be false by actual observation. The layers are thickest on those sides of a tree where the largest branches occur, and are, throughout, of greater size in such years as afford the most genial period to vegetation.

In the centre of the wood is situated the *medulla* or *pith*. It is a soft, cellular, membranous substance, juicy when young, and extending from the ends of the roots to the extremities of the branches. In the first stages of vegetation, it occupies but a small space: it gradually dilates; and, in shoots of a year old, and in young trees, it is of considerable diameter; as their age increases, it gradually diminishes, and at length becomes totally extinct, its place being occupied by perfect wood. Its functions are little understood. It appears to be connected with the production of young shoots; for, as soon as it becomes extinct in

a branch, that member loses, in a great degree, the power of producing them; that power, apparently, being transferred to those younger branches that still retain their pith in perfection.

The stem is by no means an essential part of a plant, since many are destitute of it; to such trees as naturally are gifted with one, it is somewhat injurious to prevent its formation. Standard fruit trees, under similar circumstances of soil, season, and culture, generally produce finer-flavoured fruit than either dwarf standards or espaliers. This fact appears to be accounted for by the discoveries of the indefatigable Knight, which evince that plants, during the latter part of the summer, are employed in preparing nourishment for the production of the foliage and blossom in the succeeding spring; this nourishment is perfected and deposited in the alburnum, and mixes with the sap during its ascent in that season. Of a consequence it is found to increase in density proportionate to the height at which it is extracted.

The Leaves are highly vascular organs, in which are performed some of the most important functions of a plant. They are very general, but not absolutely necessary, organs, since the branches sometimes perform their offices; such plants, however, as naturally possess them, are destroyed, or greatly injured, by being deprived of them. The duration of a leaf is, in general, but for a year, though in some trees, &c. they survive for twice or thrice that period. These organs are, in general, of a green colour. Light seems to have a powerful influence in causing this; since, if kept in the dark, they become of a pale yellow, or even white hue, unless uncombined hydrogen is present, in which case they retain their verdure, though light is absent. Hence their etiolation would seem to arise from being unable to obtain, under ordinary circumstances, this gas, except when light is present. Now, the only source from which they can obtain hydrogen, is by decomposing water; and how light assists in the decomposition may, perhaps, be explained by the disoxygenising power with which it is gifted. The violet rays of the spectrum have this power in the greatest degree; and Sennebier has ascertained by experiment, that those rays have the greatest influence in producing the green colour of plants. When leaves are of any other hue than green, they are said to be *coloured*. This variegation is often considered to be a symptom either of tenderness or debility; and it is certain, when the leaves of a plant become generally white, that that individual is seldom long-lived. Mr. Knight, however, has demonstrated that variegation is not a certain indication of a deficiency of hardihood.

The functions of the leaves appear to be a combination of those of the lungs and stomach of animals; they not only modify the food brought to them from the roots, so as to fit it for

increasing the size of the parent plant, but they also absorb nourishment from the atmosphere. The sap, after elaboration in these organs, differs in every plant; though, as far as experiments have been tried, it appears to be nearly the same in all vegetables when it first arrives to them. The power of a leaf to generate sap, is in proportion to its area of surface, exposure to the light, and congenial situation.

Leaves throw off a very considerable quantity of water. Dr. Hales found that a cabbage emitted daily nearly half its weight of moisture, and a sunflower three feet high perspired in the same time 1 lb. 14 oz. But of all the plants of which the diurnal perspiration has been ascertained, the Cornelian Cherry (Cornus máscula) transpires the most, the exhalation amounting to near twice the weight of the plant in twenty-four hours. This aqueous expiration takes place chiefly during the day; is much promoted by heat, and checked by rain or a reduction of temperature.

On the free performance of this function of plants their health is dependent in a very high degree; and I believe that half the epidemics to which they ure subject arise from its derangement. The clubbing of the roots of the *Brássica* tribe, I consider, arises entirelp from it. In the drought of summer, when the moisture supplied to a cabbage by its root does not any thing near equal the exhalation of its foliage, to supply the deficiency the plant endeavours, by forming a kind of spurious bulbous root, to adapt itself to the contingency; in the same manner that, in dry situations, the fibrous roots of *Phlèum* praténse, *Alopecùrus* geniculátus, &c. acquire a tuberous form, as bulbous or tuberous rooted plants, it is well known, will exist in a soil so deficient in moisture as to destroy all fibrous-rooted vegetables.

Evergreens transpire less moisture than deciduous plants, which would lead to the expectation that they are more capable of living in dry situations, which really is in general the case.

Leaves have the power of absorbing moisture as well as of emitting it, which power of absorption they principally enjoy during the night.

During the day leaves also absorb carbonic acid gas, which they decompose, retaining its carbon, and emitting the greatest part of the oxygen that enters into its composition. In the night this operation is in a certain measure reversed, a small quantity of oxygen being absorbed from the atmosphere, and a yet smaller proportion of carbonic acid emitted.

The hints and warnings which these facts suggest to the mind of every reflecting practitioner, are numerous. They explain and enforce the necessity of a regular, and by no means as to quantity indiscriminate, supply of water to plants; the importance of shading after their transplanting, and of a free circula-

tion of air, &c.; and the necessity of keeping the leaves as clean, and as free from injury, as possible. The leaves of plants must often be removed, and in some instances this is done with essential benefit, but the horticulturist should constantly keep in mind that with every one that he removes he deprives the plant of a primary organ of its existence. Light, it has been just stated, is the cause of the green colour of plants, but it should be observed that its full power is only beneficial when directed upon their upper surface. This is evidenced by the position they always maintain. If the branches of a tree, trained against a wall or other support, are so moved, when their leaves are completely expanded, that the under side of the foliage is most exposed to the light, they are always found to regain their natural position in a day or twe. If the experiment is often repeated on the same individual, the leaves to the last continue to revert, but become gradually weaker in the effort, partially decay, and their epidermis peels off. Succulent leaves are particularly sensible of light, but those of pinnated leguminous plants are still more so.

(To be continued.)

Art. III.—*On Bees.*

[FROM THE INDEPENDENT COURIER, MAINE.]

Mr. Editor,—Noticing with pleasure an article on this subject in your paper of the 14th ult. I thought some remarks in reply might be appropriate.

It informs us, that "the cruel system of smothering bees may now be totally dispensed with." This is an important truth; and the plan it recommends for this purpose, called "driving," is certainly practicable, but I must doubt its being the best method. The article does not instruct us at what season it should be done. The bees might as well be smothered, as left to starve; as they must, if driven into an empty hive too late. If too early, we shall find in the old hive but very little compensation for our trouble. I performed this operation on a large swarm of bees, a year ago last summer, with great facility, by inverting the old hive on to the ground, quickly placing the new one over it, stopping the holes at the meeting of both hives, and then rapping gently the sides of the old one with a stick. The use of a metal pot is unnecessary. After rapping a few minutes, I placed the new hive, containing the bees, where the old one stood, and found myself in full possession of their former premises, with all the privileges, appurtenances, &c. This was done about midsummer, in imitation, as I suppo

sed of French Apiarians, that the bees might have just time to lay in sufficient store for winter. But my triumph was short. My hive, though full of comb, had little honey; and two or more distinct broods of young bees, in different states of progression; though it had sent out three fine swarms the same season. The next day I restored my bees to their old habitation, with its contents, in the same manner that I had driven them out of it. They went busily to work; and, on smothering them in the fall, I found it entirely filled with fine honey. Though I intend not to kill any more, I shall not adopt this plan again, till I can ascertain the proper season, *if any such there be.*

Another method, which I suppose to be the German, is, to invert the hive on to the ground in the autumn, and take out by hand, as much honey as you think the bees can spare, while an assistant keeps them back by blowing smoke upon them through a large match made of bitter herbs, rolled up with linen rags. This I have tried once with good success.

But the plan I like best is as follows:—I made a large hive in the usual form, omitting the top. In this hive, at about two-thirds its height, I placed a floor of slats, sufficiently open for bees to pass through. On this floor I placed four small hives, made of thin stuff, and of such dimensions as exactly to fill the chamber, but not crowded so hard as to prevent any one from being lifted at pleasure. Each of these four had a small strap fastened across its top to lift it out by; the whole was then covered with a sound piece of board, which was not nailed on, but hung on the back side with leather hinges, and fastened down in front with a strap. Into this hive I put a good swarm of bees in July. Early in October, the hive being full, I raised the lid and lifted out in succession two of the small ones. Some half dozen bees in each, soon left it and went peaceably home. Those two small hives contain fifteen pounds of honey in the comb; the most perfect specimen of purity and sweetness that can be imagined. These being emptied, were returned to their places; and I have no doubt that the bees can well spare the contents of the other two. But wishing to be sure, and leave them enough, as I have but few bees, I shall not take them till spring. RUSTICUS.

Art. IV.—*To destroy Grubs, Wire-worms, and other Insects.*

[FROM THE NEW-ENGLAND FARMER.]

The following article was published some time since by the Highland Society:—"The following preparation is humbly recommended as a valuable remedy to vanquish, if not entirely to

exterminate all the tribe of vermin that prove so injurious to the industry of those who cultivate the soil:

Take tobacco leaves, cut them small, and make a strong infusion of them, by pouring hot water upon them in a tub. The infusion must not be boiled as that would carry off by steam a great part of the most valuable principle, the essential oil of the tobacco. When this infusion is cold, dissolve in it one or two pounds of common gum arabic; and when the latter is dissolved a pound or more of flour of sulphur may be added, particularly if it is intended to give a smart washing to wall fruit trees. It is conceived that from January to March, (if the weather be mild) is the best time for the application of the above infusion to wall fruit trees, and to all kinds of gooseberry and currant bushes, previously pruning them, and weeding clean round their stems. Some days after the first washing, which may be done with a watering pot or garden engine, it will be beneficial to prepare a portion of the infusion with an additional quantity of gum arabic, to be applied with a brush to the stems of the bushes, at least for a foot or more above the ground. The air of the atmosphere will generally keep the gum moist, and any vermin that may rise from the earth in the course of the spring will be arrested by the gum, and the tobacco will kill them effectually. There is one species of grub that never quits the ground until it becomes a butterfly. This species destroys cabbages and cauliflowers by attacking the roots about an inch below the surface of the earth. It will, therefore, be necessary before these vegetables are earthed up, to give a small portion of the infusion to each plant from a watering pot; and it is farther recommended, when these plants are taken up to be transplanted, that the roots be put into the infusion for a few minutes before they are dibbled into the earth. It is wonderful how much this infusion promotes the vigour of vegetation, when it gets to the root of any plant. Vipers, which are common in gardens in England and the south of Scotland, will soon forsake the garden in which this infusion is used freely. The essential oil of tobacco, if applied to the mouth of a viper upon the tip of a small rod, will kill the reptile to a certainty. This oil will kill the most poisonous snakes of warm climates. The tobacco leaf yields a considerable quantity of essential oil, which is readily obtained by smoking tobacco in a nipple-glass. The oil will condense in the bulb of the glass; and is so caustic, that it will destroy the epidermis when it touches the human skin.

Art. V.—*On Bots in Horses.*

[from the American Farmer.]

Having seen in the Farmer various recipes for the cure of bots in horses, none of which have given general satisfaction, if we may judge from the inquiries which are still made for remedies, I send you one, on which I have practised for more than half a century with invariable success. I received it from a German veterinarian, who came to this country with the Baron Steuben, and was attached, as farrier, to the general staff of the main army, in the years 1778 and 9. He may be remembered by some of the military gentlemen of that day, under the dignified appellation of Count Saxe, a *nom de guerre*, given him by the Baron, on his entering our service. He was a man of great skill and celebrity in his profession. The ingredients are simple, and too mild to produce any injurious effects on the animal to whom they may be administered. They consist of new-milk, honey or molasses, common salt and water, and linseed oil. The manner of preparing and administering is as follows: as soon as the disease (the symptoms of which are unerring,) is ascertained, drench the patient, fasting if possible, with a quart of fresh milk, saturated with honey, molasses, or sugar; to be preferred in the order stated. Leave him at rest for two hours—at the expiration of which, having previously prepared some strong brine, by boiling as much common salt in water as can be dissolved in it, drench him as before, with a pint of it, when cool. After a similar period of two hours give him half a pint of linseed oil, and the remedy is complete.

The rationale, established, as I conceive, by a process I shall presently state, is as follows. It is well ascertained that bots destroy the life of a horse, by feeding on the integuments of the stomach, and finally perforating it. Preferring, however, a sweetened milk, to a flesh diet, they detach themselves from the intestines, and glut the savory beverage. When satiated, their volume becomes enlarged, the skin extended and thin; in which state, the strong brine by dissolving destroys them. The operation of the oil is to sheath the wounds they have inflicted, to aid the cathartic effects of the salt, and to carry off remaining impurities.

The process or experiment on which the aforegoing theory is found, shall now be stated. Some years since, when travelling, I stopped at the house of an intelligent and respectable innholder, in the village of Poughkeepsie, county of Dutchess, who had that morning lost a horse by bots. The remedy he had used, by advice of a physician, was spirit of turpentine; which failed of success. To satisfy himself, whether it would be effective under any circumstances, he had taken from the animal

Reproduced from poor material

some worms after his death, and immersed them in a cup of the spirit, for the space of about an hour. He then presented to them a piece of crude flesh, to which they immediately attached themselves, and adhered so firmly as to be drawn from the vessel without loosing their hold, and appeared to have suffered no inconvenience from their immersion. I gave him my recipe, and he determined to try its effects, immediately upon a fresh parcel of worms. I could not wait to see the result; but was afterwards minutely informed by him of his process and its effects. He selected four of the largest worms he could find, together with a part of the stomach to which they were attached, and immersed the whole in the prepared milk. They immediately quitted their hold of the fragment of the stomach, and gorged the liquid. In this situation they remained two hours, without touching the flesh they had quitted. When extracted, their size was more than doubled, and their skins so thin from extension, as to render them semi-transparent. They were now placed in the brine, prepared as directed, and at the expiration of two hours, they were not only lifeless, but nothing remained of them, but their heads and skins.

The following fact, will further serve to shew the complete efficacy of this remedy. At the first stage of a journey, in the month of June, having travelled moderately about twelve miles, my horse refused his feed; to which I paid little attention supposing he had been well fed before I set out; at the next stage, of about the same distance, he exhibited the most violent symptoms of a severe attack of bots. Such as great restlessness, rolling on the earth, and gnawing it—striking his feet against his abdomen, and biting his sides. I immediately administered my remedy; excepting the oil, which could not be procured. I shortly after turned him to pasture, where he soon began to eat, and the next morning was well enough to pursue his journey, without any signs of uneasiness, except when his sides were touched, which lasted but a few hours.

Horses may, by attention, be preserved at all times from a virulent attack by bots. A table spoonful of hickory ashes, with a handful of salt, mixed with their meal twice a week, will afford perfect security. Whether its operation is prophylactic or remedial is of less consequence than to be ascertained of the fact, for which I do not hesitate to vouch. Should it, however, be the latter, and that the ashes and salt destroy the erucæ in their incipient state, it may be well to be acquainted with what physicians term the pathognomonic diagnostic, or the symptoms indicating the particular disease, and no other. In this stage of it, the animal affected, every four or five minutes, gradually raises his tail above the horizontal line of his back, and then lowers it with a twitching or jerking motion; making three or four stops or stages in its passage downwards. The ashes and salt may

then be given: but should the symptom continue the other remedy should be speedily resorted to, for the growth of the worm is very rapid.

The manner in which bots are produced, has been a subject of almost as much discussion, as the best mode of getting rid of them. A communication on this question made, some years since, by a Mr. Billings, to the agricultural society of Dutchess, puts it at rest. He states that he took some of the nits, attached to the hairs of a horse's legs, by what is usually called the bot bee; hatched them by the warmth of his hand; placed the vermiculi under glass, and fed them with animal food: in which situation they grew rapidly, went through the various transformations of pupa, &c. incident to the insect tribe, and terminated in the perfect bot bee, or fly.

MORGAN LEWIS.

PART III.

MISCELLANEOUS INTELLIGENCE,

American Silk.—It is with pleasure we notice the high reputation in which American Silk is held. As yet but little has been brought into market, but specimens have been exhibited to those who are capable of judging, and they have pronounced it excellent. In a late Philadelphia paper we observed the certificate of four Coach Lace and Fringe Manufacturers. to whom a skein of the Floss Silk, made by the Miss Waties' of Stateburg, (So. Ca) was submitted. Two of them pronounced it equal to any imported Floss Silk, and the other two pronounced it excellent. Silk prepared at Philadelphia has been assayed in France by direction of the Chamber of Commerce, which we here republish :—

CHAMBER OF COMMERCE.—"The Chamber had requested one of its members to cause to be assayed at Lyons, the silk that has lately been prepared at Philadelphia.

The assay took place recently upon a sample prepared by Mr. d'Homergue, of Nismes, son of Louis d'Homergue, late proprietor of a splendid filature of Silk, in the said town.

It results from that assay, publicly executed at Lyons, by Pierre Mazel, licensed assayer of Silks, that the raw Silk obtained in Philadelphia is of an extraordinary quality, and is admirably adapted to all the uses of fabrication. Its degree of fineness is 16 dwts. so that it would produce singles of 50 dwts; or organzine of 32, and tram or woof silk of 30, a quality of silk extremely rare in our country. American Silk is fine, nervous, good, regular, clean, of a fine colour; in a word, it unites all the qualities that can be wished for. Its market price in the state of raw Silk, well reeled, according to its different qualities, well prepared, would be 26 francs a pound, and the sale of it at Lyons, would be very easy, particularly if there was a constant supply of bales weighing from 100 to 150 pounds.

The Chamber of Commerce loses no time in publishing information so satisfactory. They ought, more than ever, to excite the Americans to plant mulberry trees and raise silk, a kind of industry that will afford great advantage to both countries, and may in future give birth to establishments of various kinds, and be a new source of wealth to the United States."

Scuppernong Grape.—In a communication to the American Farmer, Mr. Wilson, of Newbern, (N. C.) observes—"We have discovered, that to prune this Vine (Scuppernong) injures it, and that the Vine of every species of Grapes produces and flourishes much the best upon scaffolds, six or eight feet high, and placed thirty or forty feet apart, allowing the Vines ample space to spread, and luxuriate. A single Vine of the Scuppernong sort, made this season three barrels of juice. Our woods are full of the Grape Vines. They ascend to the very tops of the tallest trees, and there hang to the elements their rich fruit in beautiful

clusters. Generally, the birds destroy them, being beyond the reach of less airy aspirants. I have a very pleasant wine in bottles made from the Scuppernong Grapes of the last season. Our native bunch Grape, the Arena of Herbemont, is one of our very best wine Grapes. That we can make wine and sugar in this section of North-Carolina, is by no means problematical, and a few of us have turned our attention to them. Should we succeed only so far as to furnish ourselves with these items, we shall have gained something in rural economy. Wine and sugar are expensive articles, and are of daily consumption."

New Indigo Plant.—Our neighbours at Manilla appear to be much elated by the discovery of what they consider a new description of Indigo Plant, among the indigenous productions of the island. And by the kind assistance of cientific riend we are enabled to present our readers with a translation of the account in Spanish, published in a late number of the Registro Mercantil, by the Economical Society of Manilla. It is described, says the Spanish paper, as having from time immemorial been in use among the natives, for producing a beautiful blue dye, more especially in the provinces of Camarines and Albay, under the names of Payanguit and Aranguit; but had escaped scientific observation until in the year 1827 it attracted the notice of Padre Mata, Corresponding Member of the Economical Society in the Province of Samar. He subjected it to various experiments, forming it into cakes like Indigo, with which he coloured several articles of cotton, silk, and linen, as well as woollens: and struck with the beauty and fixed nature of the colour produced, which appeared to him in nowise inferior to Indigo, he resolved on bringing it to the notice of the Society, to whom he forwarded specimens of the cakes and the stuffs which he had dyed.

The Society in consequence requested several of its corresponding members in those provinces, to repeat the experiments of the Padre, all of whom having concurred in a similar report, and forwarded to Manilla a considerable supply of the leaf, and cakes, and finally the living plant itself; a committee of merchants was appointed to determine, after submitting the dye to chemical analysis, whether its identity with Indigo was sufficiently ascertained to justify its being brought to market under that designation, without fraud, and whether it was likely to fetch the same price as Indigo. The merchants and chemists having decided this point affirmatively, declaring the dye to be in every respect the same as Indigo, and possessed of all the properties of that celebrated colouring substance, a committee of scientific members was finally appointed to draw up a description of the plant.

The native name of the plant is Payanguit. It is described as attaining the thickness of a man's thigh, scandent by means of attaching its extremities to the neighbouring trees, full of milky sap. It grows and thrives when planted to props, and a plant of the size specified yields a greater quantity of leaves, than the most leafy plant of the Indigo shrub; its leaves are upwards of three inches in length, and more than two in breadth. The trunk is a little rough, and with fissures, but in its native soil is smooth. The flowers are white, and some of a light yellow colour. P. Mata states, that in Samar they are purple, and have scarcely a perceptible smell. In Manilla the plant flowered in the month of September.—*Canton Register.*

French Method of Transplanting.—During dry weather, the gardeners of Paris do not wait for rain as ours generally do; but as soon as their crops require removing, it is done in the following manner. Having chosen the spot, they well water the top, and immediately dig it under, and afterwards water the fresh surface, and as soon as it is dry enough, it is raked, and the plants put in without any regard to the mid-day sun; they continue to water the bed three or four times a day, until the plants have taken

root. It is surprising how soon lettuces, cabbages, &c. will be well rooted by such treatment, and with what vigour they grow after the first shower of rain. What would have been the state of such plants had they remained in the seed bed? They would have drawn each other; their first leaves would have dropped off, and general debility would have followed, not easy to be removed: but, by the French treatment, not a leaf will be lost. Now, if we consider the principle, it is simply this; that every plant placed in the sun in water will in no way flag, and the continued wet state of the bed for the first few days is similar to it; besides, the presence of the sun contributes powerfully to the rooting of the plants.—*Extracted from the Gardener's Magazine.*

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French Luting for Grafting.—The best luting wherewith to cover the newly grafted scions, is composed of equal quantities of train oil and rosin, prepared in the following manner: First, melt the rosin in an earthen vessel; then pour in the oil, and mix them well, to be applied when cold, with a painter's brush. This composition is used in the Northwest part of France, (Bretagne) with great success. It has this advantage, that it never cracks, nor admits rain or wind to the grafts, which is the usual cause of their failing. It is more expeditiously put on than the common clay covering, and looks much neater, but what renders it more useful, is, that the grafts covered with this composition seldom fail. Scions laid under earth, or steeped in water for a few days, grow better than those taken from the parent tree.—*New Monthly Review.*

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Saltpetre as a Manure.—The following information respecting the use of saltpetre may prove valuable to such of our readers who live in situations where the employment of more bulky purchased manures is impracticable:—It was applied in the beginning of May last, in Sussex, in the proportion of one hundred weight and a half per acre, to wheat, oats, and grass; the effects in the corn were evident, at a distance, in June; and the estimated produce at harvest was fully one-third more than in those parts of the fields which were dressed in the customary way, with lime, compost, or dung. That part of the pasture to which it was applied, and which before only produced long, coarse, sour, grass, which the cattle would scarcely touch, was, after its application, eaten quite bare. In hops it was used in double quantity, or three hundred weight per acre, where it produced great rankness of vine, but a less quantity of hops, by one-third, than the other part of the plantation, dressed in the usual way; this might possibly arise from too great a quantity having been used. In obtaining a quantity, it should be through the medium of a broker, at the India house sales, where not less than five tons are sold; the price was, last year, 20*l.* per ton; it is now 25*l.* Should a less quantity be purchased, from another quarter, it would be advisable to have it in the East-India bags, "neat as imported." After pulverizing it it should be mixed with ashes, or other matter, so as to make it equal to the bulk of corn usually sown per acre, and sown by hand in the same manner. The writer adds, that by the continued use of it, a poor unproductive farm, purchased eight years since, has trebled its produce, and an additional rent to that amount has been offered for it. The land upon which these experiments were made, is of a cold, clayey nature; but another writer states, that it has been used by a manufacturer of gunpowder, in Kent, for many years, with great success, upon a light gravelly soil.
[*British Farmer's Magazine.*

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Vinegar, cure for Inflation in Cows.—It is found that the gastric tympany or the inflation which sometimes takes place in the stomachs of cattle, in consequence of an excess of green food, and of the gas thereby produced, and which cannot escape, may be frequently relieved by Vinegar, which puts an end to the production of gas.—*British Farmer's Magazine.*

Colour of Gauze for Grapes.—At a dinner, in company with a physician, we were served with Grapes. Two clusters attracted our particular attention; it would have been difficult to have selected any more unequal in size and appearance; one of them was large, perfectly ripe and magnificent, and the other was scarcely eatable; nevertheless, we were assured, that they were both taken from the same vine; but that the first had been covered with *black* gauze, and the second with *white*, to protect them from insects; our surprise then ceased.

The cause is very plain, and the explanation easy, when it is recollected, that the black colour *accumulates* the heat and the white repels it.—*Bon Jardinier, of* 1830.

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To produce Flowers of any required colour.—"The florist has a fine large, well formed flower—a pink, carnation, or geranium, for instance—but destitute of high or vivid colour. If this flower be capable of yielding seed, the florist can impart to the seedlings any higher colour he may choose. By a certain preparation of two flowers, whose respective properties he wishes to unite, he will produce and obtain from certain treatment, a progeny, partaking of the characteristics of both—with this special and invariable consequence, the *colour* is always that of the male—*the size and shape* that of the female."—*Extracted from the Br. Farmer's Magazine.*

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Hydrophobia.—It has been discovered by a French Chemist and Surgeon, M. Coster, "That chlorine has the power to decompose and destroy the deadly poison of the saliva of the mad dog. By its use he has prevented "the approach of Hydrophobia in animals decidedly rabid." The *rationale* is, that it combines with the hydrogen, and thus decomposes and destroys the poison. Professor Silliman and Dr. Joseph E. Muse, strongly recommend it. The latter, in a communication which appeared in the Cambridge Chronicle, considers this "discovery of more value than vaccination or any other discovery which the annals of medicine have recorded." He goes on to say—

"Of the truth of this discovery and the accuracy of the experiments, on which the statement is predicated, there can be no doubt, "it is affirmed," by the most highly valued medical authority: and M. Gay Lupac has since, reported a case, of the successful application of the same substance to poison by Prussic acid, one of the most active and virulent known in nature; and it will, probably, be extended to many others."

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"This article (chlorine) is cheap; and should, in conjunction with the mode of using it, be in the possesson of every family, because delay will render it abortive.

"It is prepared and applied in the following manner:—

"Make a strong wash by dissolving two table spoonfuls of the chloruret of lime in half a pint of water, and instantly and repeatedly bathe the part bitten. The poison will in this way be decomposed. It has proved successful when applied within six hours after the animal has been bitten."

A case is stated of a man being bitten by a dog, who had no appearance of being mad, in a fortnight after he died with every symptom of hydrophobia. It is advisable, therefore, to make use of chlorine, whenever any one is bitten by a dog, whether exhibiting symptoms of madness or not.